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OF

# ARTS and SCIENCES;

COMPREHENDING ALL

## The Branches of Uſeful Knowledge,

WITH

ACCURATE DESCRIPTIONS as well of the various MACHINES, INSTRUMENTS, TOOLS, FIGURES, and SCHEMES neceſſary for illuſtrating them,

AS OF

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By a SOCIETY of GENTLEMEN.

The SECOND EDITION,
With many ADDITIONS, CORRECTIONS, and other IMPROVEMENTS.

———*Hic undique Gaza*
*Congeritur* ——— VIRG.

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A NEW AND COMPLETE

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R, or r, a liquid consonant, being the seventeenth letter of our alphabet. Its found is formed by a guttural extrusion of the breath, vibrated through the mouth, with a sort of quivering motion of the tongue drawn from the teeth, and cannulated with the tip a little elevated towards the palate. In greek words it is frequently aspirated with an *h* after it, as in *rhapsody*, *rhetoric*, &c. otherwise it is always followed by a vowel at the beginning of words and syllables.

In the notes of the antients, R. or RO. signifies *Roma*; R. C. *Romana civitas*; R. G. C. *rei gerendæ causa*; R. F. E. D. *recte factum & dictum*; RG. F. *regis filius*; R. P. *res publica*, or *Romani principes*; and R. R. R. F. F. F. *res Romana ruet ferro*, *fame*, *flamma*.

Used as a numeral, R antiently stood for eighty, and with a dash over it, thus R̄, for eighty thousand; but the greek r, or ρ, signified an hundred.

In the prescriptions of physicians, R or ℞ stands for *recipe*, *i. e.* take.

RAAB, a city of lower Hungary, situated at the confluence of the rivers Danube and Raab, and subject to the house of Austria: east longitude 18°, north latitude 48°.

RABATE, in falconry, is said of a hawk, when by the motion of the hand, lure, *&c.* she leaves off pursuing her prey or quarry.

RABBETING, in carpentry, the planing, or cutting of channels or grooves in boards, *&c.*

In ship-carpentry, it signifies the letting in of the planks of the ship into the keel; which, in the rake and run of a ship, is hollowed away, that the planks may join the closer.

RABBI, or RABBINS, a title which the pharisees and doctors of the law among the Jews assumed, and literally signifies masters, or excellents.

There were several gradations before they arrived at the dignity of a rabbin, which was not conferred till they had acquired the profoundest knowledge of the law and the traditions. It does not however appear, that there was any fixed age, or previous examination necessary; but when a man had distinguished himself by his skill in the written and oral law, and passed through the subordinate degrees, he was saluted a rabbin by the public voice.

Among the modern Jews, for near seven hundred years past, the learned men retain no other title than that of rabbi, or rabbins: they have great respect paid them, have the first places or seats in their synagogues, determine all matters of controversy, and frequently pronounce upon civil affairs: they have even a power to excommunicate the disobedient.

RABBINET, a small piece of ordnance,

 between

between a falconet and a base. See the article CANNON.

RABBINISTS, among the modern Jews, an appellation given to the doctrine of the rabbins concerning traditions, in opposition to the caraites, who reject all traditions. See the article CARAITES.

RABBIT, *cuniculus*, in zoology, a well known animal of the lepus, or hare-kind, with a very short tail.

The rabbit, though a smaller, is a handsomer creature than the hare, but is of various colours even in the same country, its general one in this kingdom being a pale brownish-grey on the back, and white on the belly; however, there are some darker, of a silvery-grey, and altogether white.

There is also a long-tailed species, of the size of our common rabbit, called the siberian rabbit, from its being frequent in Russia and Tartary.

For the method of catching rabbits, by means of ferrets, see FERRET.

RACCOURCY, in heraldry, signifies the same as coupee; that is, cut off or shortened; and denotes a cross, or other ordinary, that does not extend to the edge of the escutcheon, as they always do when absolutely named without such distinction.

RACE, in general, signifies running with others in order to obtain a prize, either on foot, or by riding on horse-back, in chariots, *&c.*

Racing was one of the exercises among the antient grecian games, which was performed in a course containing an hundred and twenty five paces; and those who contended in these foot-races were frequently clothed in armour. Chariot and horse races also made a part of these antient games. See GAMES.

For horse-racing, as practised amongst us, see the article HORSE-RACING.

RACE, in genealogy, a lineage or extraction continued from father to son.

RACHITIS, the RICKETS, in medicine. See the article RICKETS.

RACILLA, one of the least of the islands of the Archipelago, near the island of Aio, not inhabited.

RACK, in the manege, a pace in which a horse neither trots nor ambles, but shuffles as it were between.

The racking-pace is indeed much the same as the amble, only it is a swifter time and shorter tread.

RACK is also a wodden frame, made to hold hay or fodder for cattle.

RACK, an engine of torture, furnished with pullies and chords, *&c.* for extorting confession from criminals.

RACK, ARAC, or ARRAC, in commerce, a spirituous liquor made by the Tartars of Tongusia, who are subject to the czarina of Muscovy. This kind of rack is made of mare's-milk, which is left to be sour, and afterwards distilled twice or thrice between two earthen pots closely stopped, from whence the liquor runs through a small wooden pipe. This liquor is more intoxicating than brandy distilled from wine.

Rack is also a spirituous liquor which the English get from Batavia or Malacca, of which there are three sorts, the one being extracted from the cocoa-tree, the second from rice, and the third from sugar: but the first is the best and most in use. It is made of the blossom-bunch of the cocoa-tree: for which purpose they tie the bunch while it is still wrapped up within its cod, or membrane, with a piece of packthread, and then with a knife make a cross cut in that bunch, a little above the place where it is tied, and adapt a pitcher to it to receive the liquor, which is called toddy, and is vinous, palatable and sweet: others use a bamboe-cane instead of a pitcher. Having thus drawn the liquor, they let it ferment, and afterwards distil it.

Goa and Batavia are the chief places for rack. At Goa there are several kinds; single, double, and treble distilled: but the double distilled, which is that commonly sent abroad, is but a weak spirit when compared with batavia-rack; yet, on account of its peculiar and agreeable flavour, it is preferred to all the other racks of India. The prior rack, made at Madrass, the Columbo and Quilone rack, being fiery hot spirits, are but little valued by the Europeans, and therefore seldom imported, though they are highly prized among the natives.

Rack, on being imported, pays a duty of 6 l. 15 s. 6 d. the ton, containing two hundred fifty-two gallons: and a drawback, on exportation, of 6 l. 1 s. 3 d. besides which, it pays for the excise-duty, 4 s. 8 d. the gallon.

*To* RACK *wines*, &c. to draw them off from their lees, after their having stood long enough to clear and settle.

Hence rack-vintage is frequently used for the second voyage our wine-merchants used to make into France for racked-wines.

RACKELSBURG, a town of Germany, in the circle of Auftria, twenty-three miles fouth-eaft of Gratz.

RACKET, a kind of bat to ftrike the ball with at tennis; ufually confifting of a lattice or net-work of cat-gut ftrained very tight in a circle of wood, with a fhaft or handle.

RACKET is alfo a kind of fnow fhoe, or machine, which the favages of Canada bind to their feet, to enable them to walk more commodioufly on the fnow; made much in the manner of a tennis-racket. Its figure is a lozenge, of which the two obtufe angles are turned off. It is bound about with very fine thongs of leather, the mafhes of which are much fmaller and clofer than thofe of our rackets. In the middle is fitted a kind of fhoe lined with wool or hair, to be tied on to the ancle.

RACKOON, *coati*, in zoology, an american quadruped of the fhape of a beaver, only fomewhat fmaller, and with hair like that of a fox; its head too is like that of a fox, only that the ears are fhorter, roundifh, and naked; its tail is longer than its body, and not unlike that of a cat, with annular ftreaks of different colours.

RADIÆA, in anatomy, a branch of the brachial artery. See ARTERY.

RADIÆUS, or RADIALIS. See the article RADIALIS.

RADIAL CURVES, are curves of the fpiral kind, whofe ordinates, if they may be fo called, all terminate in the center of the including circle, appearing like radii of that circle, whence the name. See the articles CURVE and SPIRAL.

RADIALIS, or RADIÆUS, in anatomy, the name of two mufcles of the arm; one of which, called *radialis internus*, is one of the three flexor mufcles of the carpus, or hand, which arifing from the internal condyle of the humerus, is inferted into the bone of the carpus next the thumb; and the other, called *radialis externus*, is one of the three extenfor mufcles of the hand, which arifing from the external condyle of the humerus, is inferted into the firft metacarpal bone. See FLEXOR and EXTENSOR.

RADIANT, or RADIATING POINT, in optics, is any point of a vifible object from whence rays proceed. See the articles VISION and RADIATION.

RADIANT, or RAYONANT, in heraldry. See the article RAYONANT.

RADIATED FLOWERS, in botany, are fuch as have feveral femi-flofcules fet round a difk, in form of a radiant ftar: thofe which have no fuch rays are called difcous flowers. See the articles FLOWER, BOTANY, &c.

The term radiated is alfo ufed with refpect to one of the antient crowns. See the article CROWN.

RADIATION, the act of a body emitting or diffufing rays of light all round, as from a center. See the articles LIGHT, RAY, &c.

Radiation is confidered in optics as threefold, *viz.* direct, reflected, or refracted. See the articles VISION, REFLECTION, and REFRACTION.

Though every vifible body be radiating, yet it need not be luminous in itfelf, but only illuminated; that is, it may diffufe rays received from a luminous body, as well as emit thofe of its own.

Some ufe the term radiation, to denote the motion of the animal fpirits; whereas others rather incline to the opinion of their circulation. See the articles ANIMAL SPIRITS, CIRCULATION, &c.

*Plane of* RADIATION. See PLANE.

RADICAL, in general, fomething that ferves as a bafis or foundation.

Hence phyficians talk much of a radical moifture. See *Radical* MOISTURE.

In grammar, we give the appellation radical to primitive words, in contradiftinction to compounds and derivatives. See the article PRIMITIVE.

Algebraifts alfo fpeak of the radical fign of quantities, which is the character expreffing their roots. See the articles ROOT and CHARACTER.

RADICATION, a term ufed by fome for the action whereby plants take root, or fhoot out roots. See the articles ROOT and VEGETATION.

RADICLE, that part of the feeds of all plants, which upon vegetating becomes its root, and is difcoverable by the microfcope. See VEGETATION.

RADICOFANI, a town of Tufcany, 42 miles fouth of Sienna.

RADIOMETER, an inftrument otherwife called the fore-ftaff. See the article FORE-STAFF.

RADISH, *raphanus*, in botany, &c. See the article RAPHANUS.

RADIUS, in geometry, the femi-diameter of a circle, or a right line drawn from the center to the circumference. See the article CIRCLE.

In trigonometry, the radius is termed the whole fine, or fine of 90°. See the article SINE.

For

For the radius of the evolute, of curvature, &c. in the higher geometry, see EVOLUTE, CURVATURE, &c.

Some alſo call the fore-ſtaff *radius aſtronomicus*. See FORE-STAFF.

RADIUS, in anatomy, the exterior bone of the arm, deſcending along with the ulna from the elbow to the wriſt. See the article SKELETON.

In its upper extremity there is a glenoid cavity for its articulation with the humerus; alſo a creſt, by means of which it is articulated with the ulna: in the lower extremity the head is thicker, and of a more angular figure, with a very large hollow in its middle, for its articulation with the wriſt.

RADIX, the ſame with root. See the article ROOT.

RADNOR, the capital of the county of Radnor in Wales, ſituated in weſt long. 3° 6′, north lat. 52° 20′.

RAFFLING, a game with three dice, in which he who throws the greateſt pair, or pair royal, in three caſts, wins the prize or ſtake.

The raffle is properly a doublet or triplet: for a raffle of all aces or duces, carries it againſt mere points.

Raffling is alſo uſed when a number of people club for the purchaſe of a commodity; and he that throws the higheſt on three dice takes it.

RAFTERS, in building, are pieces of timber, which ſtanding by pairs on the reaſon or raiſing piece, meet in an angle at the top, and form the roof of a building.

It is a rule in building that no rafters ſhould ſtand farther than twelve inches from one another: and as to their ſizes or ſcantlings, it is provided by act of parliament, that principal rafters, from twelve feet ſix inches to fourteen feet ſix inches long, be five inches broad at the top and eight at the bottom, and ſix inches thick. Thoſe from fourteen feet ſix inches to eighteen feet ſix inches long, to be nine inches broad at the foot, ſeven inches at the top, and ſeven inches thick: and thoſe from eighteen feet ſix inches, to twenty-one feet ſix inches long, to be ten inches broad at the foot, eight at the top, and eight thick. Single rafters, eight feet in length, muſt have four inches and a half, and three inches three quarters in their ſquare. Thoſe of nine feet long muſt be five and four inches ſquare.

Principal rafters ſhould be nearly as thick at the bottom as the beam, and ſhould diminiſh in their length one fifth or one ſixth of their breadth; the king-poſts ſhould be as thick as the principal rafters, and their breadth, according to the bigneſs of them that are intended to be let into them, the middle part being left ſomewhat broader than the thickneſs.

RAG, or RAKE, a company, or herd of young colts.

RAGGED-HAWK, among falconers, is one that has his feathers broken. See the article HAWK.

RAGGED, in heraldry. See RAGULED.

RAGOUT, or RAGOO, a ſauce, or ſeaſoning, intended to rouſe the appetite when loſt or languiſhing.

This term is alſo uſed for any high ſeaſoned diſh prepared of fleſh, fiſh, greens, or the like; by ſtewing them with bacon, ſalt, pepper, cloves, and the like ingredients. We have ragouts of celery, of endive, aſparagus, cock's-combs, giblets, cray-fiſh, &c.

The antients had a ragout called garum, made of the putrified guts of a certain fiſh kept till it diſſolved into a mere ſanies, which was thought ſuch a dainty, that, according to Pliny, its price equalled that of the richeſt perfumes.

RAGULED, or RAGGED, in heraldry, jagged or knotted. This term is applied to a croſs formed of the trunks of two trees without their branches, of which they ſhew only the ſtumps. See plate CCXXVII. fig. 2.

Raguled differs from indented, in that the latter is regular, the former not.

RAJA, the title of the indian black princes, the remains of thoſe who ruled there before the moguls. Some of the rajas are ſaid to preſerve their indepencdeny, eſpecially in the mountainous parts; but moſt of them pay an annual tribute to the mogul. The indians call them *rai*; the Perſians *raian*, in the plural; and our travellers *rajas*, or *ragias*.

RAJA, in ichthyology, a genus of the chondropterygious order of fiſhes, with five apertures of the gills on each ſide; the head and body are depreſſed or flat; the ſides are terminated with broad fins, which ſupply the place of pectoral fins in other fiſhes; the eyes are in the upper part of the head, and behind them is a ſingle foramen; and the tail is uſually long and ſlender.

To this genus belong the thornback, fire-

fire-flaire, sea-eagle, white-horse, skaite, and torpedo or cramp-fish.

RAJAMAHAL, a city of the hither India, situated on the river Ganges, in 86° 30′ east long. and 24° 30′ north lat.

RAJANIA, in botany, a genus of the dioecia hexandria class of plants, without any flower petals; the fruit is roundish, and contains a single seed of the same shape.

RAIL, in architecture, is used in different senses, as for those pieces of timber which lie horizontally between the pannels of wainscot; for those which lie over and under the balusters in balconies, staircases, and the like; and also for those pieces of timber which lie horizontally from post to post in fences, either with poles or without.

RAIL, *ortygometra*, in ornithology, a genus of birds of the order of the scolopaces, the beak of which is shorter than the toes: it is of a compressed form, and terminated in a point; but the two chaps are equal in length. It is of the size of the common magpye, and is an elegant bird, of a bright brown colour, variegated with black spots; it is common in rich pastures, where its constant note is *crex, crex.*

RAIN, a watery-meteor, which descends from the clouds in form of drops of water. See CLOUD, METEOR, *&c.*

Rain is apparently the precipitated vapours of watery clouds: thus, when various congeries of clouds are driven together by the agitation of the winds, they mix and run into one body, and by that means dissolve and condense each other into their former substance of water; also the coldness of the air is a great means to collect, compact, and condense clouds into water; which being heavier than the air, must of necessity fall through it in the form we call rain. Now the reason why it falls in drops, and not in whole quantities, as it becomes condensed, is the resistance of the air; whereby, being broken and divided into smaller and smaller parts, the farther it passes through the air, it at last arrives to us in small drops.

Mr. Derham accounts for the precipitation hence, that the vesiculæ being full of air, when they meet with a colder air than that they contain, their air is contracted into a less space; and, consequently, the watery shell rendered thicker, so as to become heavier than the air, *&c.*

Others only allow the cold a part in the action, and bring in the winds as sharers with it: indeed, it is plain, that a wind, blowing against a cloud, will drive its vesiculæ upon one another, by which means several of them coalescing, will be enabled to descend; and the effect will be still more considerable if two opposite winds blow towards the same place. Add to this, that clouds already formed, happening to be aggravated by fresh accessions of vapour continually ascending, may thence be enabled to descend.

According to Rohault, the great cause of rain is the heat of the air, which, after continuing for some time near the earth, is at length carried up on high by a wind, and there thawing the snowy villi, or flocks of the half frozen vesiculæ, reduces them into drops; which, coalescing, descend.

Others, as Dr. Clarke, *&c.* ascribe this descent of the clouds rather to an alteration of the atmosphere than of the vesiculæ; and suppose it to arise from a diminution of the elastic force of the air. This elasticity, which depends chiefly or wholly on the terrene exhalations, being weakened, the atmosphere sinks under its burden, and the clouds fall.

Now the little vesicles, being once upon the descent, will persist therein, notwithstanding the increase of resistance they every moment meet with. For as they all tend toward the center of the earth, the farther they fall, the more coalitions will they make; and the more coalitions, the more matter will there be under the same surface; the surface only increasing as the squares, but the solidity as the cubes; and the more matter under the same surface, the less resistance there will be to the same matter. Thus, if the cold, wind, *&c.* act early enough to precipitate the ascending vesicles, before they are arrived at any considerable height, the coalitions being but few, the drops will be proportionably small; and thus is formed a dew. If the vapours be more copious, and rise a little higher, we have a mist or fog. A little higher still, and they produce a small rain, *&c.* If they neither meet with cold nor wind, they form a heavy, thick, dark sky.

Hence, many of the phænomena of the weather may be accounted for: as, why a cold summer is always a wet one, and a warm, a dry one; Why we have commonly

monly moſt rain about the equinoxes; Why a ſettled, thick, cloſe ſky, ſcarce ever rains, till it have been firſt clear. As to the quantity of rain that falls, its proportion in ſeveral places at the ſame time, and in the ſame place at ſeveral times, we have ſtore of obſervations, journals, &c. in the Memoirs of the French Academy, Philoſophical Tranſactions, &c.

*Preternatural* RAINS, as of blood, are very frequent in our annals, and even natural hiſtories; yet, if enquired into, they will be found other things than rain. Thoſe rains, Dr. Merret obſerves, are nothing more than the excrements of inſects, as butterflies, &c. And he adds, that it is very evident the rains of wheat are nothing but ivy-berries ſwallowed by the ſtarling, and voided again by ſtool.

RAINS, in the ſea-language, all that tract of ſea to the northward of the equator, between four and ten degrees latitude, and lying between the meridian of Cape Verde and that of the eaſtermoſt iſlands of the ſame name.

It is ſo called from the almoſt continual calms, conſtant rains, thunder and lightning found there.

RAIN-BOW, *iris*, in meteorology, a meteor, in form of a party coloured arch, or ſemi-circle, exhibited in a rainy ſky, oppoſite to the ſun, by the refraction of his rays in the drops of falling rain. See the article REFRACTION.

In order to illuſtrate this phænomenon, ſuppoſe BNFG (pl. CCXXVI. fig. 1.) to be a ſpherical drop of falling rain, and AN a ray of the ſun falling upon it in the point N; which ray ſuppoſe refracted to F, from thence reflected to G, and there again refracted in the direction GR to the eye of a ſpectator; and let IG be perpendicular to the drop in the point G; then will the ray or beam of light, by its refraction at G, be ſeparated into ſeveral ſorts of rays, which will paint their reſpective colours in that part of the drop; of which that next the perpendicular IG will be red, as being leaſt refracted; and the reſt in order above it, *viz.* orange, yellow, green, blue, indigo, violet. Now it is found by computation, that the greateſt angle SEO, (*ibid.* fig. 2.) or EOP, becauſe OP parallel to SE, under which the moſt refrangible rays can come to the eye of the ſpectator at O, is 40° 17′; and that the great angle FOP, under which the moſt refrangible rays come to the eye at O, is 42° 2′: and ſo all the particles of water, within the difference of of thoſe two angles, EF, will exhibit ſeverally the various colours of the priſm, and conſtitute the interior rain-bow in the cloud. See COLOUR.

If the beam of light go not out of the drop, at G, but is reflected a ſecond time, to H; (*ibid.* fig. 1 and 2.) and is there refracted in the direction HS, making the angle SYA with the incident ray AN, it will paint on the part H the ſeveral colours of light; but in an inverſe order to the former, and more faint, by reaſon of the rays loſt by the ſecond reflection. It has been found alſo, that the leaſt angle SGO, or GOP, under which the leaſt refrangible rays can come to the eye at O, after two reflections and two refractions, is 50° 57′; and the leaſt angle HOP, under which the moſt refrangible rays can come to the eye in this caſe, is 54° 7′: whence all the colours of the exterior rain-bow, will be formed in the drops from G to H; which is the breadth of this bow, *viz.* 3° 10′; whereas the breadth of the former, or interior bow, *viz.* EF, is but 1° 45′; and the diſtance between the bows, *viz.* FG, is 8° 55′. And ſuch would be the meaſure of the bows, were the ſun but a point; but ſince his body ſubtends an angle of half a degree, it is evident, by ſo much will each bow be increaſed, and their diſtance diminiſhed.

To apprehend rightly the different affections of the rain-bow, we muſt attend to the following particulars. 1. That though the rain-bow be occaſioned by the refracted and reflected light of the ſun falling on the drops of rain, yet neither of them is produced by any rays falling on any part of the drop indifferently, but by thoſe only which fall on the ſurface of the drop BLQG (*ibid.* fig. 1, 2, 3.) in or about the point N, as the ray AN; thoſe which fall nearer to B, or farther towards L, being unconcerned in this production. 2. The internal bow is produced by two refractions and one reflection. The firſt refraction is of the incident rays extremely near AN, by which they proceed from N to one common point or focus at F, from whence they are reflected to G, and are there a ſecond time refracted towards R, and produce the various colours of the ſaid bow. 3. There is a neceſſity that ſeveral rays ſhould

ſhould be refracted together to the point F, that being reflected together from thence to G they may there go out parallel, and ſo come in quantity ſufficient to excite the ſenſation of colours in a ſtrong and lively manner. Now thoſe rays, and thoſe only, which are incident on the globule about the point N, can do this, as will appear from what follows: for, 4. The point F makes the arch QF a *maximum*, or the diſtance QF from the axis of the drop SQ is greater than any other diſtance from whence any other rays nearer to the axis, as SD, SE, or farther from it, as SH, SI, are reflected; becauſe thoſe which are nearer after the firſt refraction tend to points in the axis produced more remote than that to which the ray SN tends; and therefore as their diſtance from the axis increaſes, ſo likewiſe will the diſtances of their points of reflection QP, QO, till the ray becomes SN; after which the rays more remote from the axis, as SH, SI, are refracted towards the points XY, which are nearer and nearer to the axis; and this occaſions the points of reflection on the fartheſt ſide of the drop to decreaſe again from F towards Q. 5. Hence it will neceſſarily happen, that ſome rays above and below the ray SN will fall upon the ſame point, as O or P, on the fartheſt ſide; and for that reaſon they will be ſo reflected from thence as to go out of the drop by refraction parallel to each other. Thus let SE below, and SH above the ray SN, be refracted both to one point O; from hence they will be reflected to M and L, and will there emerge parallel, 'tis true, but alone; being diveſted of their intermediate rays SN, which going to a different point F will be reflected in a different direction to G, and emerge on one ſide, and not between thoſe rays, as when they were incident on the drop. All which is evident from the figure. 6. As this will be the caſe of all the rays which are not indefinitely near to SN, it is plain, that being deprived of the intermediate rays, their denſity will be ſo far diminiſhed, as to render them ineffectual for exciting the ſenſation of colours; and they are therefore called inefficacious rays, in contradiſtinction to thoſe which enter the drop near SN, and which, having the ſame point F of reflection, are not ſcattered like the others, but emerge together at G, ſo as to conſtitute a beam GR of the ſame denſity with the incident beam SN, and therefore capable of exhibiting a vivid appearance of colours, and for this reaſon are called efficacious rays.

*Phænomena of the* RAINBOW. The firſt is, that each is variegated with all the priſmatic colours. This is a neceſſary conſequence of the different refrangibility of the rays refracted and reflected in drops of falling rain. Let *A* (*ibid.* fig. 4.) be ſuch a drop, SN a ray entering it at N, which is refracted to F, from whence refracted to G, where, as it emerges, it is refracted into all the ſeveral ſorts of rays of which it is compoſed, *viz.* GR, the leaſt refrangible or red making ray, GO the orange, GY the yellow, GG the green, GB the blue, GI the indigo, and GV the violet, or moſt refrangible ray.

The truth of this may be eaſily proved by experiment, by ſuſpending a glaſs globe filled with water in the ſun-ſhine, and viewing it in ſuch a poſition, that the rays SN will fall upon it, and emerge to the eye at A, under the ſeveral angles from SFR to SFV; which may be eaſily effected by letting the globe deſcend from *A* to G, by a ſtring going over a pulley.

Hence, the ſecond phænomenon, *viz.* the circular form, is accounted for, and alſo the third, which is the breadth of the bow; for that will be equal to the angle $ARG = RGV = 1° 45'$, where the ray, as here, emerges after one reflection. Theſe particulars are repreſented more completely in fig. 5. where BGD is the red circumference formed by the rotation of the ray *A*G, that can firſt come to the eye at A; and C*g*E is the violet arch formed by the leaſt refrangible ray *gA*; after which the rays are all refracted below the eye. And thus, by the intermediate rays and colours, the whole interior bow is produced.

The fourth phænomenon is the appearance of two bows. This follows from hence, that after an efficacious ray of light SN, entering a drop of rain, has been twice reflected on the fartheſt ſide at F and H, it will emerge refracted into all its ſimple or conſtituent rays at G upon the upper ſide of the drop, ſo as to make with the incident ray the angle $GYN, = SYA, = 54° 10'$, if that ray be the violet ſort, or moſt refrangible; but

but if it be of the red or laſt refrangible ſort, then the ſaid angle is but 50° 58′=S*y*A.

Therefore, all thoſe drops which are ſo ſituated around the eye, that their moſt refrangible rays ſhall fall upon it, muſt with thoſe rays make an angle with the line AP paſſing through the eye parallel to the ſun's rays, *viz.* the angle GAP, equal to the angle SYA, or GAP=54° 10′. Theſe rays, therefore, will every where exhibit a violet colour in the arch PGL. For the ſame reaſon, thoſe drops whoſe leaſt refrangible rays fall upon the eye at A, make the angle *g*AP = 50° 58′; and ſo the ray A*g*, revolving about the axis AQ, will deſcribe the circular arch M*g*K, which will exhibit the deepeſt red; and all the drops between G and *g* will paint the ſeveral other coloured peripheries, all which together will complete the exterior bow.

The fifth phænomenon is the greater breadth of the exterior bow. Thus, if from 54° 10′ we ſubduct 50° 58′, we ſhall have 3° 12′=G*g*= the width of the outer bow; which, therefore, is almoſt twice as wide as the interior bow.

The ſixth phænomenon is the diſtance between the two bows, which is thus determined: from the angle which the leaſt refringible ray in the upper bow makes with the axis AP, *viz.* 50° 58′, ſubtract the angle 42° 2′, which the moſt refrangible rays make therewith in the lower bow, and the remainder 8° 56′=*g*AF is the arch of diſtance between the bows.

The ſeventh phænomenon is the inverſe order of the colours in the two bows. This follows from the contrary parts of the drop on which the ray is incident, and from whence it emerges and is refracted. Thus, becauſe the rays SN enter the upper part of the drop, and emerge from the lower, it is evident the rays refracted in this caſe (*viz.* in the interior bow) will have a ſituation quite the reverſe of thoſe which enter on the lower part of the drop, and are refracted from the upper, as in the exterior bow, whoſe colours are violet, indigo, blue, green, yellow, orange, and red; whilſt thoſe of the other are red, orange, yellow, green, blue, indigo, and violet; counting from the upper parts downwards in both.

The eighth phanomenon is the faintneſs of the exterior bow, in compariſon of the interior one. This is the conſequence of the rays being twice reflected within the drops which form the outer bow. They who make the experiment in a dark chamber, may wonder when they obſerve how large a part of the beam (that enters the globule at N) goes out at F, that there ſhould be enough in the remaining part FG to exhibit the colours ſo ſtrong and vivid in the firſt bow as they appear; but then, conſidering how much of this reſidual ray is refracted at G, it is rather a wonder how the very ſmall part reflected to H, ſhould there, when refracted, be in quantity ſufficient to excite any diſtinct ideas of colours at all.

The ninth phænomenon is, that ſometimes more than two bows appear; as in a very black cloud we have obſerved four, and a faint appearance of a fifth: but this happens rarely. Now, theſe ſpurious bows, as we may call them, cannot be formed in the manner as the two principal bows are, that is, by refraction after a third, fourth, fifth, &c. refraction; for the beam is by much too weak to exhibit colours by refraction, even after the third reflection only, much leſs would it after a fourth or fifth. Beſides, though after a third and fourth reflection of the rays they ſhould be ſuppoſed capable of ſhewing their colours, yet the bows made thereby would not appear at the ſame time with the other two, nor in the ſame part of the heavens, but in the rain between us and the ſun, and muſt be viewed by the ſpectator's face turned towards the ſun, and not from it, as in the other caſe.

The tenth phænomenon, is the appearance of the bows in that part of the heavens oppoſite to the ſun. This neceſſarily happens from the incident and emergent ray being both on one ſide of the drop; for it is evident, that in order to ſee the colours, we muſt look to that part againſt which the ſun ſhines.

The eleventh phænomenon is, that they never appear but when and where it rains. This is becauſe rain affords a ſufficient plenty of drops, or aqueous ſpherules, proper to reflect and refract the light fit for this purpoſe, which cannot be done without a requiſite ſize, figure, and diſpoſition of the particles, which the vapour of the cloud does not admit, and therefore clouds alone exhibit no ſuch appearance.

The twelfth phænomenon is the dimen-

ſion

ſion of the bows. This is determined eaſily; for continuing the axis AP to Q, the center of the bows, we have the ſemidiameter of each bow in the angle QAg, or QAG; the double of which gives the angles which the whole diameters of the bows ſubtend, and are therefore the meaſure of their magnitude.

The thirteenth phænomenon is the altitude of the bow above the horizon, or ſurface of the earth. This is equal to the angle GAT, which may be taken by a quadrant, or it may be known for any time by having given the ſun's altitude, which is equal to the angle TAQ; which therefore ſubducted from the conſtant angles QAF, or QAY, will always leave the angle of the apparent height of the bow.

*Lunar* RAINBOW. The moon ſometimes alſo exhibits the phænomenon of an iris, by the refraction of her rays in drops of rain in the night-time.

Ariſtotle ſays, he was the firſt that ever obſerved it; and adds, that it is never viſible, but at the time of full moon.

The lunar iris has all the colours of the ſolar, only fainter. See Phil. Tranſ. nº 331.

*Marine* RAINBOW, the ſea-bow, is a phænomenon ſometimes obſerved in a much agitated ſea, when the wind, ſweeping part of the tops of the waves, carries them aloft; ſo that the rays of the ſun are refracted, &c. as in a common ſhower.

F. Bourzes, in Phil. Tranſ. obſerves, that there are ſcarce above two colours diſtinguiſhable, a dark yellow on the ſide next the ſun, and a pale green on the oppoſite ſide. But there are ſometimes twenty or thirty of them ſeen together. They appear at noon day, and in a poſition oppoſite to that of the common bow, the concave ſide being turned upwards.

There is a kind of white colourleſs rainbow which Mentzelius and others ſaw at noon-day. M. Marriote, in his fourth Eſſaie de Phyſique, ſays, they are formed in miſts, as the others are in ſhowers; having obſerved ſeveral of them both after ſun-riſing and in the night.

The want of colours in theſe, is owing to the exceeding tenuity of the veſicles of the vapour, which being only little watery pellicles bloated with air, the rays of light undergo but little refraction in paſſing out of air into them. Hence the rays are reflected from them compounded, as they come.

Rohault mentions coloured rainbows on the graſs formed in the morning dew.

RAISER, in building, a board ſet on edge under the fore ſide of a ſtep, ſtair, &c. See the article STAIR CASE.

RAISING, in the manege, one of the three actions of a horſe's legs, the other two being the ſtay and the tread.

In caprioles, curvets, &c. the raiſing or lifting up of his leg is eſteemed good, if he perform it hardily and with eaſe; not croſſing his legs, nor carrying his feet too much out or in, yet bending his knees as much as is needful.

RAISING-PIECES, or REASON PIECES, in architecture, are pieces that lie under the beams, and over the poſts or puncheons.

RAISINS, grapes prepared by ſuffering them to remain on the vine till they are perfectly ripe, and then drying them in the ſun, or by the heat of an oven. The difference between raiſins dried in the ſun, and thoſe dried in ovens, is very obvious: the former are ſweet and pleaſant, but the latter have a latent acidity with the ſweetneſs that renders them much leſs agreeable.

The common way of drying grapes for raiſins, is to tie two or three bunches of them together while yet on the vine, and dip them into a hot lixivium of wood-aſhes with a little of the oil of olives in it. This diſpoſes them to ſhrink and wrinkle, and after this they are left on the vine three or four days ſeparated on ſticks in an horizontal ſituation, and then dried in the ſun at leiſure, after being cut from the tree. The fineſt and beſt raiſins are thoſe called in ſome places Damaſcus and Jube raiſins; which are diſtinguiſhed from the others by their ſize and figures: theſe are flat and wrinkled on the ſurface, ſoft and juicy within, and near an inch long, and when freſh and growing on the bunch, are of the ſize and ſhape of a large olive.

The raiſins of the ſun, and jar-raiſins, are all dried by the heat of the ſun, and theſe are the ſorts uſed in medicine. However, all the kinds have much the ſame virtues; they are all nutritive and balſamic; they are allowed to be attenuant, are ſaid to be good in nephritic complaints, and are an ingredient in pectoral decoctions, in which caſes, as alſo in all others where aſtringency is not required of

of them, they ſhould have the ſtones carefully taken out.

Raiſins, on being imported, pay the following duties: large raiſins, the hundred weight, 11 s. $8\frac{17\frac{1}{2}}{100}$d. and on exportation, draw back, 10 s. $11\frac{62\frac{1}{2}}{100}$d. Raiſins of the ſun, the hundred weight pay, on importation, 14 s. $\frac{90}{100}$d. and on exportation, draw back, 13 s. $1\frac{1}{2}$d. Of Lipra or Belvidera, the hundred weight pay, on importation, 7 s. $1\frac{59\frac{3}{4}}{100}$d. and on exportation, draw back, 6 s. $10\frac{46\frac{1}{4}}{100}$d. Of Smyrna, either black or red, the hundred weight pay, on importation, 9 s. $3\frac{45}{100}$d. and, on exportation, draw back, 8 s. $9\frac{3}{4}$d. Of Alicant, Denia, and other raiſins, not otherwiſe rated, the hundred weight pay, on importation, 6 s. $10\frac{72\frac{1}{2}}{100}$d. and, on exportation, draw back, 6 s. $7\frac{87\frac{1}{2}}{100}$d. More, if in a foreign bottom, for every 20 s. value of the above rates, 3 s.

Raisin *brandy*, a name given by our diſtillers to a very clear and pure ſpirit, procured from raiſins, fermented only with water. Thus treated, they yield a ſpirit ſcarce at all diſtinguiſhable from ſome of the wine-ſpirits; for there are as many kinds of wine-ſpirits, as there are of grapes. The coarſer the operation of diſtilling is performed in this caſe, the nearer will be the reſemblance of the wine-ſpirit; that is, there will be moſt of this flavour in the ſpirit, when as much as can be of the oil is thrown up with a galloping heat. Dr. Shaw obſerves, that the diſtillers are very fond of the wine-ſpirit, with which they hide and diſguiſe the taſte of their nauſeous malt, and other ſpirits; and in defect of that ſpirit, this of raiſins, made in this coarſe manner, will go almoſt as far. It is indeed ſurpriſing how extenſive the uſe of theſe flavouring ſpirits is, ten gallons of raiſin-ſpirit, or ſomewhat leſs of the wine-ſpirit, being often ſufficient for a whole piece of malt ſpirit, to take off its native flavour, and give it an agreeable vinoſity. It is no wonder therefore, that the diſtillers and ordinary rectifiers are ſo fond of this, as it is a good cloak for the defects and imperfection of their proceſſes. When raiſin-brandy is intended for common uſe, the fire ſhould be kept ſlower and more regular in the diſtillation, and the ſpirit, though it hath leſs of the high flavour of the grape, will be more pleaſant and more pure.

RAITING, or Rating, the laying of flax, hemp, timber, &c. when green, in a pond or running water, to ſeaſon, and prepare it for future uſes.

RAKE *of a ſhip* is all that part of her hull which hangs over both ends of her keel. That which is before, is called the fore-rake, or rake-forward; and that part which is at the ſetting on of the ſtern-poſt, is called the rake-aft, or afterward.

Rake *of the rudder*, is the hindermoſt part of it.

Rake, among hunters, the ſame with rag. See the article Rag.

Rake, in mining, the ſame with vein. See the article Vein.

RAKEE, in falconry, a term applied to a hawk that flies out too far from the fowl.

RAKING, of an horſe, is drawing the ordure with the hand out of the fundament, when he is coſtive, and cannot dung: in doing which the hand ſhould be anointed with butter or ſallad-oil.

An horſe is alſo ſaid to rake, when being ſhoulder-ſplaid, or having ſtrained his fore-quarters, he goes ſo lame as to drag one of his fore-legs in a ſemi-circle.

Raking table, or Raked table, among architects, is a member hollowed in the ſquare of a pedeſtal, &c. See the article Cavetto and Scotia.

RALLYING, in war, reaſſembling or calling together troops broken and put to flight.

RAM, in zoology, the male of the ſheep kind. See the article Sheep.

Ram, in aſtronomy, the ſame with aries. See the article Aries.

*Battering* Ram, in antiquity, a military engine uſed to batter and beat down the walls of places beſieged.

The battering ram was of two ſorts, the one rude and plain, the other compound. The former ſeems to have been no more than a great beam which the ſoldiers bore on their arms and ſhoulders, and with one end of it by main force aſſailed the wall. The compound ram is thus deſcribed by Joſephus: it is a vaſt beam, like the maſt of a ſhip, ſtrengthened at one end with a head of iron, ſomething reſembling that of a ram, whence it took its name. See plate CCXXVII. fig. 1. This was hung by the middle with ropes to another beam, which lay acroſs two

poſts;

Fig. 1. The Battering Ram.



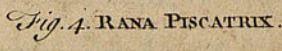




Fig. 2 Raguled. Fig. 3 Rampant.



Fig. 4. Rana Piscatrix.



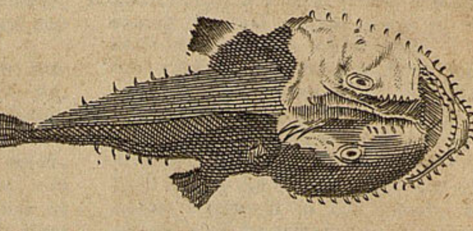


Fig. 5. Ranunculus.



Fig. 6. Rats.




J. Jefferys sculp

posts; and hanging thus equally balanced, it was by a great number of men drawn backwards and pushed forwards, striking the wall with its iron-head. Plutarch informs us, that Mark Anthony, in the Parthian war, made use of a ram fourscorce feet long: and Vitruvius tells us, that they were sometimes an hundred and six, and sometimes an hundred and twenty feet in length; and to this perhaps, the force and strength of the engine was in a great measure owing. The ram was managed at one time by a whole century of soldiers, and they being spent, were sconded by another century, so that it played continually without any intermission.

In order to calculate the force of the battering-ram, R, (plate CCXXVII. fig. 1.) suppose it to be 28 inches in diameter, and 180 feet long; and consequently its solid content 750 cubic feet; which, allowing 50 pounds for each foot, will weigh 37500 pounds: and suppose its head of cast-iron, together with three iron hoops, &c. to be 3612 pounds. Now all these weights added together, make 41112 pounds, equal the weight of the whole ram; which will require 1000 men to move it, so as to cause it to strike against the point L of the wall AHIGE, each man moving a weight of 41 pounds. The quantity of motion produced by this action, when the ram moves one foot in a second, may be expressed by the number 41112; which motion or force compared with the quantity of motion in the iron-ball B, shot out of the cannon C, will be found equal to it: for a cannon-ball is known to move as fast as sound for about the space of a mile; and if you multiply 36 pounds, the weight of the ball, by 1142, the number of feet which sound moves in one second, you will have the number 41112 for the quantity of motion or force, in the ball B striking at L. And if, after a few strokes given by the battering-ram, the mortar or cement is so loosened, that the piece of the wall ADDFE is at last by a stroke of the ram carried forward from F to K, and so beaten down; the same thing will be peformed by a cannon-ball, after an equal number of strokes.

This shews how advantageous the invention of gunpowder is; since we are thereby enabled to give such a prodigious velocity to a small body, that it shall have as great a quantity of motion as a body immensely greater, and requiring vastly more hands to work it: for three men will manage a cannon, which shall do as much execution as the above battering-ram wrought by 1000. The ram, whose force is here calculated, is taken at a mean; being bigger than some, and less than others, of those used by the antients.

Ram's head, in a ship, is a great block belonging to the fore and main-halliards. It has three shivers in it, into which the halliards are put, and in a hole at the end of it are reeved the ties.

RAMADAN, a solemn season of fasting among the mahometans, kept in the ninth month of the arabic year. This fast consists in abstaining from meat and drink, and from lying with their wives each day, from the raising of the sun till the stars appear; and is of such strict obligation, that none is excused from it; for the sick, and all others who cannot observe it in this month, are obliged to fast another entire month instead of it. So superstitious are the mahometans in the observance of this lent, that they dare not wash their mouths, or even swallow their spittle. The men are, indeed, allowed to bathe themselves, on condition they do not plunge the head under water, lest some drops enter by the mouth or ears, &c. but as for the women, they are strictly forbid bathing, for fear of taking in water at the pudendum. However, they frequently feast all night. The mahometans call this month holy, and believe, that as long as it lasts, the gates of paradise are open, and those of hell shut.

RAMAGE, the boughs or branches of trees.

Ramage-falcon, or Hawk, one that is wild and coy, as having been long among the boughs preying for itself. All falcons retain this name when they have left the aery; being so called in May, June, July and August. These are very rarely reclaimed.

Ramage-velvet. See Velvet.

RAMBERVILLERS, a city of Germany, in the dutchy of Lorrain: east long. 6° 30′, north lat. 48° 20′.

RAMEKINS, a fortress of Zeland, one of the United Provinces, situated five miles south of Middleburg.

RAMERA, a town of France, in the province of Champain, eighteen miles north-east of Troyes.

RAMIFICATION, the production of

boughs or branches, or of figures resembling branches.

RAMILLIES, a small town in the austrian Netherlands, in the province of Brabant, ten miles north of Namur.

RAMMER, an instrument used for driving down stones or piles into the ground; or for beating the earth, in order to render it more solid for a foundation.

RAMMER *of a gun*, the gun-stick; a rod used in charging of a gun, to drive home the powder, as also the shot and the wad, which keeps the shot from rolling out. The rammer of a great gun is used for the same purpose. It has a round piece of wood at one end, and the other is usually rolled in a piece of sheepskin, fitted to the bore of the piece, and is used to clear her after she has been discharged, which is called spunging the piece.

RAMPANT, in heraldry, a term applied to a lion, leopard, or other beast that stands on his hind legs, and rears up his fore feet in the posture of climbing, shewing only half his face, as one eye, *&c.* It is different from saliant, in which the beast seems springing forward as if making a sally. See plate CCXXVII. fig. 3.

RAMPART, in fortification, is an elevation of earth round a place capable of resisting the cannon of an enemy; and formed into bastions, curtins, *&c.* See FORTIFICATION, BASTION, *&c.*

A rampart ought to be sloped on both sides, and to be broad enough to allow room for the marching of waggons and cannon, beside that allowed for the parapet which is raised on it: its thickness is generally about ten or twelve fathom, and its height not above three, which is sufficient to cover the houses from the battery of the cannon. The rampart is encompassed with a ditch, and is sometimes lined or fortified on the inside, otherwise it has a berme. See the article BERME.

Upon the rampart soldiers continually keep guard, and pieces of artillery are planted there for the defence of the place.

RAMPART, in civil architecture, is used for the space left between the wall of a city, and the next houses.

RAMPHASTOS, in ornithology, a genus of birds, of the order of the picæ, the beak of which is remarkably large, and without any visible nostrils: the toes are the same in number and the same way placed as in the parrot. See PARROT.

This genus comprehends the toucan, the pepper-bird, and several other species. See the articles TOUCAN, *&c.*

RAMSEY, a market-town of Huntingtonshire, ten miles north-east of Huntington.

RAMSEY, an island in the irish channel, on the coast of Pembrokeshire: west long. 5° 20′, north lat. 51° 55′.

RAMSGATE, a port-town of Kent, situated between the north and south Foreland, eight miles south-east of Canterbury.

RAMUS, in general, denotes a branch of any thing, as of a tree, an artery, vein, *&c.*

RANA, the FROG, in zoology. See the article FROG.

RANA PISCATRIX, the FROG-FISH, in ichthyology, a fish of a very irregular figure, not unlike that of a tadpole; its body being very inconsiderable in proportion to the vast size of its head, which has a very large mouth furnished with sharp teeth, and surrounded with fleshy tubercles; and on the under part of the body there are two fins resembling a mole's feet. See plate CCXXVII. fig. 4. It is the same with the lophius. See the article LOPHIUS.

RANA, or RANULA. See RANULA.

RANCHIERA, a port-town of Terra Firma, situated in west long. 72°, north lat. 11° 34′.

RANCID, denotes a fatty substance that is become rank or musty; or has contracted an ill smell by being kept close.

RANDIA, a genus of plants, the class of which is not yet fully ascertained: its flower is monopetalous, and of the shape of a saucer; the limb is divided into five segments: the fruit is an oval, unilocular capsule, containing numerous compressed seeds, surrounded with a pulp.

RANDOM SHOT, in gunnery, is a shot made when the muzzle of a gun is raised above the horizontal line, and is not designed to shoot directly, or point blank. The utmost random of any piece is about ten times as far as the bullet will go point blank. The bullet will go farthest when the piece is mounted to about 45° above the level range. See GUNNERY.

RANFORCE RING. See the article REINFORCED RING.

RANGE, in gunnery, the path of a bullet, or the line it describes from the mouth of the piece to the point where it lodges. If the piece lie in a line parallel to the horizon, it is called the right or level range; if it be mounted to 45°, it is said to

to have the utmoft range, all others between 00 and 45° are called the intermediate ranges.

RANGER, a fworn officer of a foreft, appointed by the king's letters-patent, whofe bufinefs is to walk through his charge, to drive back the deer out of the purlieus, *&c.* and to prefent all trefpaffes within his jurifdiction at the next foreft-court.

RANGES, in a fhip, two pieces of timber that go acrofs from fide to fide; the one on the fore-caftle, a little abaft the fore-maft, and the other in the beak-head, before the wouldings of the bow-fprit.

RANGIFER, the REIN-DEER. See the article REIN DEER.

RANGING, in war, difpofing the troops in the order proper for an engagement, or for marching.

RANGING, in building, fignifies running ftrait, when the fides of a work do not break into angles.

RANINE VEINS. See RANULARES.

RANK, the order or place allotted a perfon, fuitable to his quality or merit.

RANK, in war, is a row of foldiers, placed fide by fide.

To double the ranks, is to put two ranks into one. To clofe the ranks, is to bring the men nearer: and to open them, is to fet them farther apart.

RANSOM, a fum of money paid for the redemption of a flave, or for the liberty of a prifoner of war. In our law-books, ranfom is alfo ufed for a fum paid for the pardon of fome great offence, and to obtain the offender's liberty.

RANT, in the drama, an extravagant, unnatural, and improbable flight of paffion.

RANULA, or RANA, in medicine, a tumour under the tongue, which like a ligature hinders a child from fpeaking or fucking.

The matter contained in thefe tumours is various, it being fometimes a tenacious and mucous lymph, fometimes a thick and purulent matter, and fometimes of a hard and ftony confiftence. The fafeft method of cure, according to Heifter, is to turn the tongue upwards, and to make a tranfverfe incifion through the tumour, in order to difcharge the included matter; after which you may deterge or deftroy the remaining tunic with honey of rofes fharpened with fpirits of vitriol, and then the cure may be eafily completed with a mixture of oil and fugar. Sometimes the tubercle breaks of itfelf, and then you muft deterge and heal the ulcer as before.

RANULARES, or RANINE VEINS, in anatomy, two veins under the apex of the tongue, which arife from the internal jugular, and run on either fide the linea mediana. See the article TONGUE.

RANUNCULUS, CROWFOOT, in botany, a genus of the polyandria-polygynia clafs of plants, the flower of which confifts of five obtufe petals: there is no pericarpium; the feeds, which are numerous, being connected to the receptacle, by means of very fhort peduncles. See plate CCXXVII. fig. 5.

This genus comprehends the ficaria, ranunculus, and ranunculoides of authors: there are a great many fpecies of it in our meadow and pafture grounds, where they remain after the pafture is grazed; becaufe being very acrid, the cattle never eat them, otherwife they would blifter their mouths and throats.

RAOLCONDA, a city of the hither India, fituated in the province of Golconda: eaft long. 79°, north lat. 17° 12′.

RAPACIOUS ANIMALS, are fuch as live upon prey.

The characteriftic marks of rapacious birds are, that they have a large head and a fhort neck, hooked, ftrong, and fharp-pointed talons, a fharp fight, a membranous ftomach, and not a mufculous one, or a gizzard like birds that live on grain.

RAPA, RAPE, in botany, is made by Linnæus a fpecies of braffica.

RAPE, in law, the having carnal knowledge of a woman by force and againft her will. By ftatute, whoever carnally knows a female child under ten years of age, fhall fuffer as a felon; and here it does not fignify whether fuch child confented, or was forced; it is only to be proved that the offender entered her body; the crime itfelf confifts in penetration and emiffion: but where there is neither of thefe, an attempt to ravifh, be it never fo outrageous, is deemed only an affault. In cafe a woman conceives, it is held to be no rape, from an opinion, that fhe cannot conceive unlefs fhe confent. However, it is no excufe that a woman at laft yielded to the violence and confented, if her confent was extorted by the fear of death and imprifonment. However, it is a ftrong prefumption againft the woman, if fhe make no complaint within forty days after the injury, which

which is the time allowed by law. A woman who has been raviſhed may proſecute, and likewiſe be a witneſs in her own cauſe: but it is remarked by chief juſtice Hales, that how far the woman's teſtimony is to be believed, muſt be entirely left to the jury on the trial; it being more or leſs credible according to the circumſtances of the fact. The aiders and abetters in the commiſſion of a rape are indictable as principals, and are guilty of felony without benefit of clergy. Antiently this crime was not deemed felony: but it was puniſhed with the loſs of the offenders eyes and privy members.

The civilians make another kind of rape, called rape of ſubordination or ſeduction; which is ſeducing a maid either to uncleanneſs or marriage, and that by gentle means, provided there be a conſiderable diſparity in the age and circumſtances of the parties. See the article RAVISHMENT.

RAPE *of the foreſt*, a treſpaſs committed in a foreſt by violence. See FOREST.

RAPE is alſo a name given to a diviſion of a county, and ſometimes means the ſame as a hundred, and at other times ſignifies a diviſion conſiſting of ſeveral hundreds; thus Suſſex is divided into ſix rapes, every one of which, beſides its hundreds, has a caſtle, a river, and a foreſt belonging to it. The like parts in other counties are called tithings, lathes, or wapentakes.

RAPE alſo ſignifies the ſtalks of the cluſters of grapes when dried, and freed from the fruit. This is uſed in making vinegar. See the article VINEGAR.

RAPE-SEED, the ſeed of a plant deſcribed by authors under the name of napus ſylveſtris and bunias ſylveſtris. See the article NAPUS.

Rape-ſeed is cultivated to great advantage in ſeveral counties in England, particularly in Lincolnſhire, and conſiderable quantities of it are brought from Holland. From this ſeed is drawn an oil called rape-oil, which is uſed in the woollen manufacture, and in the materia medica, is eſteemed attenuant, cordial, and ſudorific.

Rape-ſeed, on being imported, pays a duty of 5 l. 13 s. 6 d. the laſt, containing ten quarters; and draws back, on exportation, 5 l. 8 s. 9 d.

RAPHANUS, the RADISH, in botany, a genus of the tetradynamia claſs of plants, the flower of which conſiſts of four leaves diſpoſed in the form of a croſs: its fruit is a pod, containing ſeveral roundiſh and ſmooth ſeeds.

Radiſhes are attenuant, and good in ſcurvies and other diſorders proceeding from viſcidities of the juices, and other obſtructions of the glands.

RAPHIDIA, in zoology, a genus of four-winged inſects of the neuroptera order; the head of which is of a horny ſubſtance, and depreſſed; and its tail is armed with a ſlender horny weapon, not bifid at the extremity: it is about the ſize of the ſcorpion fly, and is common in meadows in July.

RAPIER, formerly ſignified a long, old-faſhioned broad ſword, ſuch as thoſe worn by the common ſoldiers: but it now denotes a ſmall ſword, as contradiſtinguiſhed from a back-ſword.

RAPINE, in law, taking away another's goods, &c. openly and by violence.

RAPOLLA, a town of Italy, in the kingdom of Naples, ſixty-ſix miles eaſt of Naples.

RAPPAHANOCK, a large navigable river which riſes in the mountains weſt of Virginia, and diſcharges itſelf into the bay of Cheſepeak.

RAPPERSWEIT, a town of Switzerland, in the canton of Zurich, ſeventeen miles ſouth-eaſt of the city of Zurich.

RAPSODY. See RHAPSODY.

RAPTU HÆREDIS, an antient writ which lay at common law, for taking away an heir that held land in ſockage. See the article RAVISHMENT.

RAPTURE, an extaſy, or tranſport of mind. See EXTASY, ENTHUSIASM, &c.

RARE, in phyſics, ſtands oppoſed to denſe, and denotes a body that is very porous, whoſe parts are at a great diſtance from one another, and which contains but little matter under a large bulk. See the following article.

RAREFACTION, *rarefactio*, in phyſics, the act whereby a body is rendered rare; that is, brought to poſſeſs more room, or appear under a larger bulk without acceſſion of any new matter.

Rarefaction is oppoſed to condenſation. See the articles CONDENSATION, COMPRESSION, and DENSITY.

Rarefaction is moſt properly reſtrained to that expanſion of a maſs into a larger bulk, which is effected by heat. All expanſion from other cauſes they call dilatation. See the articles EXPANSION, DILATATION, and FIRE.

It is by rarefaction that gunpowder has its

its effect, and to the same principle also we owe our æolipiles, thermometers, &c. The degree to which the air is rarifiable, exceeds all imagination; such is the rarefaction of common air from its own principle of elasticity, and without any previous condensation, that Mr. Boyle found it to dilate itself so as to take up 13679 times its former space; and when compressed, the same author found its greatest space when most rarified, to its least when most condensed, as 550000 to 1. See AIR and ATMOSPHERE.

Such an immense rarefaction, Sir Isaac Newton shews is inconceivable on any other principle than that of a repelling force inherent in the air, whereby its particles mutually fly from one another. This repelling force, he observes, is much more considerable in air than in other bodies, as being generated from the most fixed bodies, and that with much difficulty, and scarce without fermentation; those principles being always found to fly each other with the most force, which, when in contact, cohere the most firmly.

M. Moriotte established this as a principle, from experiments, that the different rarefactions or condensations of the air, follow the proportion of the weights wherewith it is pressed. Hence, supposing the mercury in the level of the sea suspended to 28 inches, which is the weight of the whole atmosphere; and that 60 feet height of air are equivalent to a line or $\frac{1}{12}$ of an inch of mercury, so that the barometer at the height of 60 feet from the sea, would fall a line. It is easy finding what height of air would be equal to a second, or any other line of mercury; for, as 28 inches of mercury $\frac{1}{12}$ are to 28 inches, so is the height of 60 feet of air to a fourth term, which is the height of air corresponding to a second line of mercury. And after the same manner may the height of air corresponding to each line be found, which will make a geometrical progression, the sum whereof will be the whole height of the atmosphere, and of consequence a certain part of that sum will be the height of a mountain, at whose top the barometer shall have sunk a certain quantity. See the article BAROMETER.

Mess. Cassini and Maraldi, upon measuring the heights of several mountains, found that this progression of M. Mariotte was defective; that it always gave the height of the mountains, and consequently the rarefactions, less than they really were; and from some farther experiments M. Amontons found, that the principles will only hold in the mean rarefactions, not the extremes. See the article MOUNTAIN.

The open air, in which we breathe, says Sir Isaac Newton, is 8 or 900 times lighter than water, and by consequence 8 or 900 times rarer. And since the air is compressed by the weight of the incumbent atmosphere, and the density of the air is proportionable to the compressing force, it follows by computation, that at the height of about seven english miles from the earth, the air is four times rarer than at the surface of the earth; and at the height of 14 miles, it is 16 times rarer than at the surface of the earth; and at the height of 21, 28, or 35 miles, it is respectively 64, 256, or 1024 times rarer, or thereabouts; and at the height of 70, 140, and 210 miles, it is about 1000000, 1000000000000, or 1000000000000000000, &c.

Mr. Cotes has found, from experiments made with a thermometer, that linseed-oil is rarified in the proportion of 40 to 39 in the heat of the human body; in that of 15 to 14, in that degree of heat wherein water is made to boil; in the proportion of 15 to 13, in that degree of heat wherein melted tin begins to harden; and, finally, in the proportion of 23 to 20, in that degree wherein melted tin arrives at a perfect solidity. The same author discovered, that the rarefaction of the air in the same degree of heat is ten times greater than that of the linseed-oil; and the rarefaction of the oil, about fifteen times greater than that of the spirit of wine.

RAREFACTIVES, in medicine, remedies which open and enlarge the pores of the skin, to give an easy vent to the matter of perspiration: or such medicines as rarefy the blood, as anise, mallows, pellitory, chamomile flowers, linseed, &c.

RASANT, or RAZANT, in fortification. Rasant-flank, or line, is that part of the curtin or flank whence the shot exploded rase, or glance, along the surface of the opposite bastion.

RASEBURG, a port town of Sweden, in the province of Finland, and territory of Nyland, situated on the gulph of Finland: east long. 23°, north lat. 60° 22′.

RASEN, a market-town of Lincolnshire, situated twelve miles north-east of Lincoln.

RASH, in medicine, an eruption upon the skin,

ſkin, thrown out in fevers or ſurfeits.

RASP, a rank ſort of file. See FILE.

RASTAT, the name of two towns of Germany; one in the circle of Bavaria, and archbiſhopric of Saltzburg, ſituated on the river Ens, thirty-five miles ſouth of the city Ens; another in the circle of Swabia, and marquiſate of Baden, ſituated on the eaſt ſide of the river Rhine, twenty-one miles ſouth-weſt of Philipſburg.

RAT, in zoology, the engliſh name of ſeveral ſpecies of the mus-kind; as the common-rat, the ground-rat, and the water-rat. See plate CCXXVII. fig. 6. where n° 1. repreſents the common, and n° 2. the ground-rat.

The common rat is a quadruped too well known to need much deſcription. It is of a browniſh grey colour, with a long and almoſt naked tail. It greatly reſembles the common mouſe in form, but is at leaſt five times as large: the tail is divided into more than an hundred and fifty annular joints.

The ground-rat is nearly of the ſize of the common rat, only that its tail is much ſhorter, as well as more hairy. The water-rat is conſiderably larger than the common kind: its tail is all the way of the ſame thickneſs, and is abrupt at the end: its legs are ſhorter than thoſe of the common rat, but its feet are longer, and the toes connected by membranes.

*Norway*-RAT. See NORWAY.

RAT-TAILS, or ARRESTS, in the manege, ſignify hard callous ſwellings upon the hinder legs under the hough, running along the ſinew.

A horſe is called rat-tail, when he has no hair upon his tail.

RATAFIA, a fine ſpirituous liquor, prepared from the kernels, *&c.* of ſeveral kinds of fruit, particularly of cherries, and apricots.

Ratafia of cherries is prepared by bruiſing the cherries, and putting them into a veſſel wherein brandy has been long kept; then adding to them the kernels of cherries, with ſtrawberries, ſugar, cinnamon, white pepper, nutmegs, cloves; and to twenty pound of cherries, ten quarts of brandy. The veſſel is left open ten or twelve days, and then ſtopped cloſe for two months before it be tapped.

Ratafia of apricots is prepared two ways, *viz.* either by boiling the apricots in white wine, adding to the liquor an equal quantity of brandy with ſugar, cinnamon, mace, and the kernels of apricots; infuſing the whole for eight or ten days; then ſtraining the liquor, and putting it up for uſe: or elſe by infuſing the apricots cut in pieces in brandy, for a day or two, paſſing it through a ſtraining bag, and then putting in the uſual ingredients.

RATCH, or RASH, in clock-work, a ſort of wheel having twelve fangs, which ſerve to lift up the detents every hour, and make the clock ſtrike. See CLOCK.

RATCHETS, in a watch, are the ſmall teeth at the bottom of the fuſy, or barrel, which ſtops it in winding up.

RATE, a ſtandard or proportion, by which either the quantity or value of a thing is adjuſted.

RATE-TYTHE, when ſheep or other cattle are kept in a pariſh for leſs time than a year, the owner muſt pay tythe for them *pro rata*, according to the cuſtom of the place.

RATE *of a ſhip of war* is its order, degree, or diſtinction, as to magnitude, burden, *&c.* The rate is uſually accounted by the length and breadth of the gun-deck, the number of tons, and the number of men and guns the veſſel carries. Of theſe there are ſix rates. A firſt rate man of war has its gun-deck from 159 to 174 feet in length, and from 44 to 50 feet broad; it contains from 1313 to 1882 tons, has from 706 to 800 men, and carries from 96 to 100 guns. Second rate ſhips have their gun-decks from 153 to 165 feet long, and from 41 to 46 broad; they contain from 1086 to 1482 tons, and carry from 524 to 640 men, and from 84 to 90 guns. Third rates have their gun-decks from 140 to 158 feet in length, from 37 to 42 feet broad; they contain from 871 to 1262 tons; carry from 389 to 476 men, and from 64 to 80 guns. Fourth rates are in length on the gun-decks from 118 to 146 feet, and from 29 to 38 broad; they contain from 448 to 915 tons; carry from 226 to 346 men, and from 48 to 60 guns. Fifth rates have their gun-decks from 100 to 120 feet long, and from 24 to 31 broad; they contain from 259 to 542 tons, and carry from 145 to 190 men, and from 26 to 44 guns. Sixth rates have their gun-decks from 87 to 95 feet long, and from 22 to 25 broad; they contain from 152 to 256 tons, carry from 50 to 110 men, and from 16 to 24 guns.

It is to be obſerved, that the new-built ſhips

ſhips are much larger, as well as better, than the old ones of the ſame rate; whence the double numbers all along: the larger of which expreſs the proportions of the new-built ſhips, as the leſs thoſe of the old ones. See the articles SHIP and NAVY.

RATEEN, or RATTEN, in commerce, a thick woollen-ſtuff, quilted, woven on a loom with four treddles, like ſerges, and other ſtuffs, that have the whale or quilling. There are ſome rateens dreſſed and prepared like cloths; others left ſimply in the hair, and others where the hair or knap is frized. Rateens are chiefly manufactured in France, Holland, and Italy, and are moſtly uſed in linings. The frize is a ſort of coarſe rateen, and the drugget is a rateen half linen, half woollen.

RATIFICATION, *ratificatio*, an act approving of, and confirming ſomething done by another in our name.

This word is particularly uſed in our laws for the confirmation of a clerk in a benefice, prebend, *&c.* formerly given him by the biſhop, *&c.* where the right of patronage is doubted to be in the king. Ratification is alſo uſed for an act confirming ſomething we ourſelves have done in our own name.

RATIO, in arithmetic and geometry, is that relation of homogeneous things which determines the quantity of one from the quantity of another, without the intervention of a third.

Two numbers, lines, or quantities, A and B, being propoſed, their relation one to another may be conſidered under one of theſe two heads: 1. How much A exceeds B, or B exceeds A; and this is found by taking A from B, or B from A, and is called arithmetic reaſon or ratio. 2. Or how many times, and parts of a time, A contains B, or B contains A; and this is called geometric reaſon or ratio; (or, as Euclid defines it, it is the mutual habitude, or reſpect, of two magnitudes of the ſame kind, according to quantity; that is, as to how often the one contains, or is contained, in the other) and is found by dividing A by B, or B by A; and here note, that that quantity which is referred to another quantity, is called the antecedent of the ratio; and that to which the other is referred, is called the conſequent of the ratio; as, in the ratio of A to B, A is the antecedent, and B the conſequent. Therefore any quantity, as antecedent, divided by any quantity as a conſequent, gives the ratio of that antecedent to the conſequent.

Thus the ratio of A to B is $\frac{A}{B}$, but the ratio of B to A is $\frac{B}{A}$; and, in numbers, the ratio of 12 to 4 is $\frac{12}{4} = 3$, or triple; but the ratio of 4 to 12 is $\frac{4}{12} = \frac{1}{3}$, or ſubtriple.

And here note, that the quantities, thus compared, muſt be of the ſame kind; that is, ſuch, which, by multiplication, may be made to exceed one the other, or as theſe quantities are ſaid to have a ratio between them, which, being multiplied, may be made to exceed one another. Thus a line, how ſhort ſoever, may be multiplied, that is, produced ſo long as to exceed in length any given right line, and conſequently theſe may be compared together, and the ratio expreſſed; but as a line can never, by any multiplication whatever, be made to have breadth, that is, to be made equal to a ſuperficies, how ſmall ſoever; theſe can therefore never be compared together, and conſequently have no ratio or reſpect one to another, according to quantity; that is, as to how often the one contains, or is contained in the other. See the article PROPORTION.

RATIOCINATION, *ratiocinatio*, the act of reaſoning. See REASONING.

RATION, or RATIAN, in the army, a portion of ammunition, bread, drink, and forage, diſtributed to each ſoldier in the army, for his daily ſubſiſtence, *&c.* The horſe have rations of hay and oats when they cannot go out to forage. The rations of bread are regulated by weight. The ordinary ration of a foot ſoldier is a pound and a half of bread per day. The officers have ſeveral rations according to their quality and the number of attendants that they are obliged to keep. When the ration is augmented on occaſions of rejoicing, it is called a double ration. The ſhips crews have alſo their rations or allowances of biſket, pulſe, and water, proportioned according to their ſtock.

RATIONABILES EXPENSÆ, *reaſonable expences*. The commons in parliament, as well as the proctors of the clergy, in convocation, were antiently allowed rationabiles expenſas; that is, ſuch allowance as the king, conſidering the



prices

prices of all things, ſhall judge meet to impoſe on the people, to pay for the ſubſiſtence of their repreſentatives.

RATIONABILI *parte bonorum*, in law, is a writ which lies for the widow againſt the executors of her deceaſed huſband, who deny to give her the third part of his goods after the debts and funeral charges are paid. It is obſerved, that by the common law of England, the goods of a deceaſed perſon, his debts being firſt paid, ſhall be divided into three equal parts, and go to the wife, her children, and executors; wherefore this writ may be brought by the children as well as the widow. But it has been held that the writ only lies where the cuſtom of the country warrants it.

RATIONABILIBUS *diviſis*, in law, a writ that is brought where there are two lords in different towns, who have ſignories adjoining together, and one of them finds his waſte by little and little to have been incroached upon; then the lord on whoſe ground the incroachment was made ſhall have this writ againſt the other to rectify the bounds and diviſions. In which reſpect it is ſaid by Fitzherbert, to be in its nature a writ of right.

RATIONAL, *reaſonable*. See REASON.

RATIONAL is alſo applied to integral, fractional, and mixt numbers: thus we ſay rational fraction, rational integer, and rational mixt number; for the explanation and doctrine of which, ſee NUMBER and FRACTION.

Rational is applied to the true horizon, in oppoſition to the ſenſible or apparent one. See the article HORIZON.

Rational is alſo applied to quantity, ratio, &c. See QUANTITY, RATIO, &c.

RATIONALE, a ſolution, or account of the principles of ſome opinion, action, hypotheſis, phænomenon, or the like. See PRINCIPLE, PHÆNOMENON, &c. Hence rationale is the title of ſeveral books.

RATIONALE is alſo the latin name for an antient ſacerdotal veſtment, worn by the high prieſt, under the old law, being a piece of embroidered ſtuff, worn on the breaſt, about a ſpan ſquare. A rationale appears to have been antiently worn by the biſhops, under the new law: but authors are in doubt about its form; ſome having it to reſemble that of the Jews; others taking it to be only the pallium. See the article PALLIUM.

RATIONIS OS, in anatomy, a term ſometimes uſed for the os frontis. See the article FRONTIS OS.

RATIPOR, a town of Bohemia, in the dutchy of Sileſia, ſituated on the river Oder, ſixteen miles north-eaſt of Troppaw.

RATIPOR is alſo a city of hither India, capital of the province of Malva, ſituated eaſt long. 80°, north lat. 25°.

RATISBON, a city of Germany, in the circle of Bavaria, ſituated at the confluence of the rivers Danube and Regen, in eaſt longit. 12° 5′, north lat. 49°. This is a free imperial city, and here the aſſembly or diet of the ſtates of the empire meets. See the article DIET.

RATLINES, or as the ſeamen call them, RATLINS, thoſe lines which make the ladder ſteps to get up the ſhrouds and puttocks, hence called the ratlins of the ſhrouds.

RATTLE, among the antients, a muſical inſtrument of the pulſative kind, called by the Romans crepitaculum. The tintinnabulum, crotalum, and ſiſtrum, were by the ſame eſteemed only ſo many different kinds of rattles. See the articles BELL, CROTALUM, and SISTRUM.

What we commonly call rattles now, is no more than a ſtick of wax in a ſilver handle, to which is ſuſpended a number of little bells of the ſame, or ſome other metal, ſerving in the hands of children to make a rattling or tinkling noiſe, or otherwiſe to play withal.

Rattles for children the groſs, containing twelve dozen, pay, on importation, 1 s. $1\frac{86}{100}$d. and, on exportation, draw back 1 s. $\frac{15}{100}$d.

RATTLE-SNAKE, *crotalophorus*, in zoology, a genus of ſerpents, having ſcuta that cover the whole under-ſurface of the body and tail, and having the extremity of the body terminated by a kind of rattle, formed of a ſeries of urceolated articulations, which are moveable, and make a noiſe. See plate CCXXVIII. fig. 1.

Of this ſerpent, there are two ſpecies, the greater one with the ſcuta of the abdomen a hundred and ſeventy-two, of the tail twenty-one; and the leſſer rattle-ſnake, having the ſcuta of the abdomen a hundred and ſixty-five, of the tail twenty-eight. The larger is a very terrible, and, at its full growth, a very large ſerpent, growing to eight feet in length, with a proportionable thickneſs: the head is large, broad, depreſſed, and of

of a pale brown: the iris of the eye is red; the back is of a brown colour, with an admixture of a ruddy yellow, and variegated with a great many irregular tranſverſe liſts, of a deep black: the belly is of a paliſh blue; the rattle is of a firm, and as it were of a horny ſubſtance, and brown colour, compoſed of a number of cells, which are articulated one within another, which articulations being very looſe, the included points ſtrike againſt the inner ſurface of the rings they are admitted into, and make that rattling noiſe, when the ſerpent vibrates, or ſhakes its tail. This ſerpent is frequent in the woods of America: the bite is fatal, but it is eaſy to avoid it, the creature being ſluggiſh, moving ſlowly, never attacking a man unleſs provoked, and giving notice before it bites by ſhaking its rattle.

The leſſer ſpecies of this ſerpent grows to about ſeven feet in length, and in moſt particulars is like the former one, and its bite is equally miſchievous.

RATTLE-SNAKE-ROOT, the ſame with the ſenega, a ſpecies of polygala. See the article POLYGALA.

RAVA, a city of Great Poland, capital of the Palatinate of Rava, ſituated fifty miles ſouth-eaſt of Warſaw.

RAUCEDO, *hoarſeneſs*, in medicine. See the article HOARSENESS.

RAVELIN, in fortification, was antiently a flat baſtion, placed in the middle of a curtin; but now a detached work compoſed only of two faces, which make a ſaliant angle, without any flanks, and raiſed before the curtin on the counterſcarp of the place. A ravelin is a triangular work, reſembling the point of a baſtion, with the flanks cut off. See the article FORTIFICATION.

Its uſe before a curtin is to cover the oppoſite flanks of the two next baſtions. It is uſed alſo to cover a bridge, or a gate, and is always placed without the moat. There are alſo double ravelins that ſerve to cover each other: they are ſaid to be double, when they are joined by a curtin. See the article CURTIN.

RAVEN, in ornithology, a ſpecies of the corvus, of the bigneſs of a common hen, of a black colour, with a blue back: the head is ſmall, depreſſed on the crown, and flatted on both ſides: the eyes are large, bright and piercing; the beak is conſiderably long and thick, and ſomewhat rigid on the back, and ſharp at the point. See the article CORVUS.

RAVENGLAS, a port town of Cumberland, ſituated on the Iriſh Channel, thirty-eight miles ſouth-weſt of Carliſle.

RAVENNA, a city of Italy, in the pope's territories, capital of the province of Romania, ſituated eaſt long. 13°, north lat. 44° 30′.

RAVISHMENT, in law, denotes an unlawful ſeducing either of a woman, or an heir that is in ward: ſometimes it is alſo uſed in the ſame ſenſe as a rape. See the article RAPE.

RAVISHMENT *de garde*, in law, was a writ that formerly lay for the guardian by knight's ſervice, or in ſocage, againſt a perſon who took from him the body of his ward.

RAUVOLFIA, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla of which conſiſts of a ſingle funnel-faſhioned petal, with a large limb, divided into five lanceolated ſegments: the fruit is a very large, roundiſh and fleſhy bilocular drupe, with a ſingle ovated nut in each cell.

RAY, in optics, a beam of light, emitted from a radiant, or luminous body. See the article LIGHT.

Rays are defined by Sir Iſaac Newton, to be the leaſt parts of light, whether ſucceſſive in the ſame line, or cotemporary in ſeveral lines. For that light conſiſts of parts of both kinds is evident, ſince one may ſtop what comes this moment in any point, and let paſs that which comes preſently after: now the leaſt light, or part of light, which may be thus ſtopped, he calls a ray of light.

A ray, or right line, drawn from the point of concourſe of the two optical axes, through the middle of the right line, which paſſes by the centers of the two pupils of the eyes, is by ſome called a common ray. See the article VISION.

As for direct, converging and diverging rays; rays of incidence, inflection, refraction, curvature, *&c.* ſee the articles DIRECT, CONVERGING, *&c.*

RAY-FISH, *raja*. See the article RAJA.

RAYLEIGH, a market-town of Eſſex, ten miles ſouth-eaſt of Chelmsford.

RAYONANT, or *Croſs* RAYONANT, in heraldry, one which has rays of glory behind it, darting out from the center to all the quarters of the eſcutcheon, as repreſented in plate CCXXVIII. fig. 2.

RAZANT, or RASANT. See RASANT.

RAZOR, a well known inſtrument, uſed by ſurgeons, barbers, *&c.* for ſhaving off the hair from various parts of the body.

All razors are prohibited to be imported.

RAZOR-BILL, *alka*, in ornithology. See the article ALKA.

RAZOR-FISH, *dactylus*, a species of solen. See the article SOLEN.

RE, in grammar, an inseparable particle added to the beginning of words, to double or otherwise modify their meaning; as in re-action, re-move, re-export, *&c.*

REACH, in the sea-language, signifies the distance between any two points of land, lying nearly in a right line.

RE-ACTION, in physiology, the resistance made by all bodies to the action or impulse of others, that endeavour to change its state whether of motion or rest. See the articles ACTION and MOTION.

The cause of the re-action of bodies is no other than their inertia. See INERTIA.

READING, a borough-town in Berkshire, situated forty miles west of London, near the confluence of the rivers Kennet and Thames; it sends two members to parliament.

READINGS, or *various* READINGS, *variæ lectiones*, in criticism, are the different manner of reading the texts of authors in antient manuscripts, where a diversity has arisen from the corruption of time, or the ignorance of copyists. A great part of the business of critics lies in settling the readings by confronting the various readings of the several manuscripts, and considering the agreement of the words and sense.

Readings are also used for a sort of commentary or gloss on a law, text, passage, or the like, to shew the sense an author takes it in, and the application he conceives to be made of it.

RE-AFFORESTED, is where a forest, having been disafforested, is again made a forest. See the article FOREST.

RE AGGRAVATION, in the romish ecclesiastical law, the last monitory published after three admonitions, and before the last excommunication. Before they proceed to fulminate the last excommunication, they publish an aggravation, and a re-aggravation. See the article EXCOMMUNICATION.

REAL, *reale*, is applied to a being that actually exists, in which sense it coincides with actual. See the article ACTUAL.

REAL, in law, is opposed to personal. See the article PERSONAL.

Thus real action is that whereby the plaintiff lays title to land, *&c.* See the article ACTION, *&c.*

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REAL, or CHIAPA, a city of Mexico, in North America, capital of the province of Chiapa, situated west long. 97°, north lat. 17°.

REALEIO, a port-town of Mexico, in the province of Niacaragua, situated on the bay of the Pacific Ocean, in west long. 91° 30′, north lat. 12°.

REALGAR, *risigallum*, in the materia medica, a name whereby the sandarach has been a long time known in the shops. It has been also attributed to the factitious red arsenic. See the articles SANDARACH, and ARSENIC.

REALISTS, *realistæ*, a sect of school philosophers, formed in opposition to the nominalists. See NOMINALS.

Under the realists are included the scotists, thomists, and all excepting the followers of Ocham. Their distinguishing tenet is that universals are realities, and have an actual existence out of an idea, or imagination; or, as they express it in the schools, a *parte rei*; whereas the nominalists contend that they exist only in the mind, and are only ideas, or manners of conceiving things.

REALITY, *realitas*, in the schools, a diminutive of *res*, thing, first used by the scotists, to denote a thing which may exist of itself; or which has a full and absolute being of itself, and is not considered as a part of any other.

REALM, *regnum*, a country which gives its head, or governor, the denomination of a king.

REALMONT, a town of France, in the province of Languedoc, situated thirty-two miles north-east of Toulouse.

REAR, a term frequently used in composition, to denote something behind, or backwards, in respect of another, in opposition to van: thus, in a military sense, it it used for the hind part of an army, in opposition to the front. For the rear-guard, rear-half files, rear-line, rear-rank, and rear-admiral, see GUARD, FILE, LINE, RANK, and ADMIRAL.

REASON, *ratio*, a faculty, or power, of the mind, whereby it distinguishes good from evil, truth from falshood; whereby man is distinguished from beasts; and wherein it is evident he greatly surpasses them: or reason is that principle whereby, comparing several ideas together, we draw consequences from the relations they are found to have. See the article REASONING.

Some define reason to be the comprehension of many principles which the

mind

mind fucceffively can conceive, and from which conclufions may be drawn. And others conceive reafon as no other than the underftanding itfelf confidered as it difcourfes. See UNDERSTANDING.

Reafon, Mr. Locke obferves, contains two diftinct faculties of the mind, *viz.* fagacity, whereby it finds intermediate ideas; and illation, whereby it fo orders and difpofes of them, as to difcover what connection there is in each link of the chain, whereby the extremes are held together; and thereby, as it were, draws into view the truth fought for. Illation, or inference, confifts in nothing but the perception of the connection there is between the ideas in each ftep of the deduction, whereby the mind comes to fee either the agreement or difagreement of any two ideas, as in demonftration, in which it arrives at knowledge; or their probable connection, on which it gives or with-holds its affent, as in opinion. See the articles DEMONSTRATION, KNOWLEDGE, *&c.*

Senfe and intuition reach but a little way, the greateft part of our knowledge depends upon deductions and intermediate ideas. In thofe cafes where we muft take propofitions for true, without being certain that they are fo, we would need to find out, examine, and compare the grounds of their probability. In both cafes the faculty which finds out the means, and rightly applies them to difcover certainty in the one, and probability in the other, is that which we call reafon. In reafon, therefore, we may confider four degrees; firft, the difcovering and finding out of proofs. See the article INVENTION. Secondly, the regular and methodical difpofition of them, and laying them in fuch order, as that their connection may be plainly perceived. See METHOD. Thirdly, the perceiving of their connection. See JUDGMENT. And, Fourthly, the making a right conclufion. See the article CONCLUSION.

Concerning reafon, Mr. Locke thinks that fyllogifm, as was generally thought, is not the proper inftrument of it, nor the ufefulleft way of exercifing this faculty. See SYLLOGISM.

Reafon, though of very large extent, fails us in feveral inftances, as firft, where our ideas fail; fecondly, it is often at a lofs, becaufe of the obfcurity, confufion, or imperfection of the ideas it is employed about: thus, having no perfect idea of the leaft extenfion of matter, nor of infinity, we are at a lofs about the divifibility of matter. Thirdly, our reafon is often at a ftand, becaufe it perceives not thofe ideas which would ferve to fhew the certain or probable agreement or difagreement of any two other ideas. Fourthly, our reafon is very often engaged in abfurdities, and difficulties, by proceeding upon falfe principles, which being followed, lead men into contradictions to themfelves and inconfiftency in their own thoughts. Fifthly, dubious words, and uncertain figns, often puzzle men's reafon, and bring them to a nonplus. Though the deducing one propofition from another be a great part of reafon, and that which it is ufually employed about, yet the principal act of ratiocination is the finding the agreement or difagreement of two ideas one with another by the intervention of a third; as a man by a yard finds two houfes to be of the fame length, which could not be brought together to meafure their equality by juxta-pofition. Words have their confequences as the figns of fuch ideas; and things agree or difagree with what they really are, but we obferve it only by our ideas. Hence we may be able to form an idea of that ordinary diftinction of things into thofe that are according to, thofe that are above, and thofe contrary to, reafon. Thofe according to reafon, are fuch propofitions whofe truth we can difcover by examining and tracing thofe ideas we have from fenfation and reflection, and by a natural deduction find to be true or probable. Above reafon are fuch propofitions, whofe truth or probability we cannot by reafon derive from thefe principles. Contrary to reafon are fuch propofitions as are inconfiftent with, or irreconcileable to, our clear and diftinct ideas. Thus the exiftence of one God is according to reafon; the exiftence of more than one God, contrary to reafon; and the refurrection of the body after death, above reafon. Above reafon may alfo be taken in a double fenfe, *viz.* above probability, or above certainty.

Reafon, as contradiftinguifhed to faith, Mr. Locke takes to be the difcovery of the certainty or probability of fuch propofitions or truths, as the mind arrives at, by deductions made from fuch ideas, which it has got by the ufe of its natural faculties, *viz.* by fenfation or reflection; whereas faith, on the other hand, is the affent to any propofition upon the credit of the propofer, as coming immediately

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from God, which we call revelation. See FAITH and REVELATION.

This uſe of the word reaſon, our author takes to be very improper; faith, as has been already obſerved, being nothing elſe but a firm aſſent of the mind, which if regulated, as is our duty, cannot be afforded to any thing but upon good reaſon, and ſo cannot be oppoſite to it.

REASON is alſo taken in different other ſignifications; ſometimes it denotes true and clear principles; ſometimes it is taken for clear and fair deductions from theſe principles; and ſometimes for the cauſe, particularly the final cauſe.

REASONABLE AID was antiently a duty that the lord of the fee claimed of his tenants holding by knight's ſervice, or ſocage, towards marrying his daughter, or the making his eldeſt ſon a knight.

REASONING, RATIOCINATION, the exerciſe of the faculty of the mind called reaſon; or it is an act or operation of the mind, deducing ſome unknown propoſition from other previous ones that are evident and known. See REASON.

It often happens in the comparing ideas together, that their agreement or diſagreement cannot be diſcerned at firſt view, eſpecially if they are of ſuch a nature as not to admit of an exact application to one another: here then, as has been already obſerved under REASON, it becomes neceſſary to look out after ſome third idea that will admit of ſuch an application as the preſent caſe requires. Hence it appears that every act of reaſoning neceſſarily includes three diſtinct judgments, two wherein the ideas whoſe relation we want to diſcover, are ſeverally compared with the middle idea, and a third wherein they are themſelves connected, or disjoined according to the reſult of that compariſon. Now, as our judgments when put into words are called propoſitions, ſo the expreſſions of our reaſonings are termed ſyllogiſms. And hence it follows that as every act of reaſoning implies three ſeveral judgments, ſo every ſyllogiſm muſt include three diſtinct propoſitions. See the article SYLLOGISM.

In order therefore to infer a concluſion by a ſingle act of reaſoning, the premiſes muſt be intuitive propoſitions; where they are not, previous ſyllogiſms are required, in which caſe reaſoning becomes a complicated act taken in a variety of ſucceſſive ſteps. This frequently happens in tracing the more remote relations of our ideas, where many middle terms being called in, the concluſion cannot be made out, but in conſequence of a ſeries of ſyllogiſms following one another in train. Hence we may clearly perceive that reaſoning, in the higheſt exerciſe of that faculty, is no more than an orderly combination of ſimple acts of reaſoning. See DEMONSTRATION.

Thus we ſee that reaſoning, beginning with firſt principles, riſes gradually from one judgment to another, and connects them in ſuch a manner that every ſtage of the progreſſion brings intuitive certainty along with it.

All the aims of human reaſoning may in the general be reduced to theſe two. 1. To rank things under thoſe univerſal ideas to which they truly belong; and, 2. To aſcribe to them their ſeveral attributes and properties in conſequence of that diſtribution.

This firſt aim of reaſon then is to determine the genera and ſpecies of things: and the ſecond end regards the ſciences and the affairs of common life. See the articles GENUS, SPECIES, &c.

As in tracing the moſt diſtant relation of things we muſt always have recourſe to intervening ideas, and are more or leſs ſucceſsful in our reſearches, according to our acquaintance with thoſe ideas, and ability of applying them, it is evident that to make a good reaſoner two things are principally required; firſt, an extenſive knowledge of thoſe intermediate ideas, by means of which things may be compared one with another; ſecondly, the ſkill and talent of applying them happily in all particular inſtances that come under conſideration.

There is another ſpecies of reaſoning with two propoſitions, which ſeems to be compleat in itſelf, and where we admit the concluſion without ſuppoſing any tacit or ſuppreſſed judgment in the mind from which it follows ſyllogiſtically. This happens between propoſitions where the connection is ſuch that the admiſſion of the one neceſſarily, and at the firſt ſight, implies the admiſſion alſo of the other: for if it falls out that the propoſition on which the other depends is ſelf-evident, we content ourſelves with barely affirming it, and infer that other by a direct concluſion: thus, by admitting an univerſal propoſition we are forced alſo to admit of all the particular propoſitions comprehended under it; this being the very condition

that

that conſtitutes a propoſition univerſal. If then that univerſal propoſition chances to be ſelf evident, the particular ones follow of courſe, without any farther train of reaſoning.

Another ſpecies of reaſoning is that called by logicians induction; in order to the right underſtanding of which, it will be neceſſary to obſerve, that our general ideas are for the moſt part capable of various ſubdiviſions: thus the idea of the loweſt ſpecies may be ſubdivided into its ſeveral individuals; the idea of any genus into the different ſpecies it comprehends, and ſo of the reſt. If then we ſuppoſe the diſtribution to be duly made, ſo as to take in the whole extent of the idea to which it belongs, then it is plain that all the ſubdiviſions or parts of any idea taken together conſtitute that whole idea: thus the ſeveral individuals of any ſpecies taken together conſtitute the whole ſpecies, and all the various ſpecies comprehended under any genus make up the whole genus; this being allowed, it is apparent that whatever may be affirmed of all the ſeveral ſubdiviſions and claſſes of any idea ought to be affirmed of the whole general idea to which theſe ſubdiviſions belong. What may be affirmed of all the individuals of any ſpecies, may be affirmed of the whole ſpecies; and what may be affirmed of all the ſpecies of any genus, may alſo be affirmed of the whole genus. This way of reaſoning, where we infer univerſally concerning any idea, what we had before affirmed or denied ſeparately of all its ſeveral ſubdiviſions and parts, is called reaſoning by induction: thus, if we ſuppoſe the whole tribe of animals ſubdivided into men, beaſts, birds, inſects and fiſhes, and then reaſon concerning them in this manner; all men have a power of beginning motion, all beaſts, birds, and inſects have a power of beginning motion, all fiſhes have a power of beginning motion; therefore all animals have a power of beginning motion.

For the method of reaſoning by a concatenation of ſyllogiſms, ſee the article DEMONSTRATION.

For the method of reaſoning by dilemma, ſee the article DILEMMA.

For the four arguments commonly uſed in reaſoning, ſee ARGUMENT.

RE-ATTACHMENT, in law, is a ſecond attachment of a perſon, who was formerly attached and diſmiſſed the court without day, on account of the not coming of the juſtices, or other ſuch caſualty; without which, a cauſe diſcontinued cannot be revived, but the defendant muſt plead de novo.

RE-BAPTISANTS, the ſame with anabaptiſts. See ANABAPTISTS.

REBATE, or REBATEMENT, in commerce, a term much uſed at Amſterdam, for an abatement in the price of ſeveral commodities, when the buyer, inſtead of taking time advances ready money.

Rebate, which among us is uſually called prompt-payment, is eſtimated by months, and is only allowed for certain merchandize, which, according to the cuſtom of Amſterdam, are

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| German wools, | which are ſold at | 15 | months rebate. |
| Spaniſh wools, | | 21 | |
| Aſhes and pot-aſhes, | | 18 | |
| Italian ſilks, | | 33 | |
| Sugars of Braſil, | | 18 | |

That is, thoſe commodities are ſold for ready money, only deducting or rebating the intereſt of the money, which need not have been paid till the end of 15, 21, &c. months. This intereſt is uſually regulated on the foot of 8 *per cent. per annum.*

REBATEMENT, in heraldry, a diminution or abatement of the bearings in a coat of arms. See ABATEMENT.

REBEL, a town of Germany, in the dutchy of Mecklenburgh, thirty-two miles ſouth-eaſt of Guſtrow.

REBELLION, a traiterous taking up of arms againſt the king by his own natural ſubjects, or thoſe formerly ſubdued.

*Commiſſion of* REBELLION. See the article COMMISSION.

REBELLIOUS ASSEMBLY, in law, an aſſembling together of twelve or more perſons, with an intent of unlawfully making uſe of their own authority, to change or alter any laws of this kingdom, or to deſtroy the incloſures of any ground, or the banks of any fiſh-pond, pool or conduit, to the intent that it may lie waſte and void; or to deſtroy the deer in any park, fiſh in fiſh-ponds, coneys in any warren; or any houſe, barn, mills, or bays; or to burn ſtacks of corn, abate rents, or prices of victuals, &c. See the article RIOT.

REBOUND. See the article RECOIL.

REBUS, an ænigmatical repreſentation of ſome name, &c. by uſing figures or pictures inſtead of words, or parts of words.

Camden mentions an inftance of this abfurd kind of wit in a gallant who expreffed his love to a woman, named Rofe Hill, by painting in the border of his gown a *rofe*, a *bill*, an *eye*, a *loaf*, and a *well*; which, in the ftyle of the rebus, reads, *Rofe Hill I love well.* This kind of wit was long practifed by the great, who took the pains to find devices for their names. It was, however, happily ridiculed by Ben Johnfon, in the humourous defcription of Abel Drugger's device, in the Alchemift; and by the Spectator, in the device of Jack of Newberry; at which time the rebus, being raifed to fign pofts, was grown out of fafhion at court.

REBUTTER, in law, the defendant's anfwer to the plaintiff's furrejoinder, in a caufe depending in the court of chancery, *&c.* Alfo when a perfon warrants lands, *&c.* to another, and he that has the warranty, or his heir, fues him to whom the warranty is made, or his heirs or affignee for the fame thing; if he, who is fued, plead the deed or fine with warranty, and pray judgment whether the plaintiff fhall be received to demand the thing which he ought to warrant to the party, againft the warranty in the deed, *&c.* this is called a rebutter.

RECANATI, a town of Italy, in the province of Ancona, fix miles weft of Loretto.

RECAPITULATION, in oratory, *&c.* a part of the peroration. See the article PERORATION.

Recapitulation is a fummary, or a concife and tranfient enumeration of the principal things infifted on in the preceding difcourfe, whereby the force of the whole is collected into one view.

RECAPTION, in law, the taking a fecond diftrefs of one formerly diftrained for the fame caufe during the plea grounded upon the former diftrefs. It is alfo the name of a writ which lies for the party thus diftrained, to recover damages, *&c.*

RECEIPT, or RECEIT, in commerce, an acquittance, or difcharge, in writing, intimating that the party has received a certain fum of money, either in full for the whole debt, or in part, or on account.

RECEIPT, in book-keeping, is an account of all the money and goods received. See the article BOOK.

RECEIPT, or RESCEIT, in law. See the article RESCEIT.

RECEIPT *of the exchequer.* See the article EXCHEQUER.

RECEIPT, in medicine. See RECIPE.

*Auditor of the* RECEIPTS. See the article AUDITOR.

RECEIVER, in chemiftry, a veffel of earth, glafs, *&c.* for receiving any diftilled liquor.

RECEIVER, in pneumatics, a glafs-veffel for containing the thing on which an experiment in the air-pump is to be made. See AIR-PUMP, EXHAUSTED, *&c.*

There are feveral forts of glafs-receivers; As A (plate CCXXVIII. fig. 3. nº 1.) open at top, covered with a brafs-plate, and oiled leather, at D, and kept down by the crofs piece EF, fcrewed down upon the pillars B, C, which are fcrewed into the table of the air-pump. See the articles AIR and PUMP.

H (*ib.* nº 2.) is a receiver open at top, with a plate and collar of wet leathers K, through which goes the flip-wire GI, fo tight as to let in no air: this wire ferves to lift any thing by its hook.

M (*ib.* nº 3.) is a transferrer, or receiver, that may be taken off from the pump, in an exhaufted ftate; N being a plate and leather, on which ftands the receiver M, clofe at top; and O, a cock, to open or fhut the paffage. Now, the cock being open, and the air exhaufted by the pump, if the cock be fhut, the receiver and pipe may be taken away from the air-pump, the vacuum remaining in M.

Mr. Boyle obferves, that a very fmall crack in the receiver, ufed in pneumatical experiments, does not render them ufelefs; for upon evacuating the internal air, the external preffing the glafs on all fides, brings the edges of the glafs clofe together. But in cafe of confiderable flaws a plafter may be applied, made of quick-lime, finely powdered, and nimbly ground, with a proper quantity of the fcrapings of cheefe, and water enough to bring the mixture to a foft pafte; which, when the ingredients are well incorporated, will have a ftrong and fetid fcent; and then it muft be immediately fpread upon a linen-cloth, and applied, left it begin to harden.

RECEIVER, *receptor* or *receptator*, in law, is commonly underftood in a bad fenfe, and ufed for fuch as knowingly receive ftolen goods from thieves, and conceal them. This crime is felony, and the punifhment is tranfportation for fourteen years.

RECEIVER alfo fignifies an officer; of which there are feveral kinds, denominated from the particular matters they receive, the places where, or the perfons from whom, &c. 1. Receiver of the fines is an officer appointed to receive the money of fuch perfons as compound with the king, upon original writs fued out of chancery. 2. Receiver general of the dutchy of Lancafter is an officer belonging to the dutchy-court, who collects all the revenues, fines, forfeitures, and affeffments within that dutchy. 3. Receiver general of the public revenue, is an officer appointed in every county, to receive the taxes granted by parliament, and remit the money the treafury.



RECEPTACULUM CHYLI, or PECQUET'S RESERVATORY, the refervoir or receptacle for the chyle, fituated in the left fide of the upper vertebra of the loins, under the aorta, and the veffels of the left kidney. See CHYLIFICATION and THORACIC DUCT.

RECEPTACULUM SEMINUM, RECEPTACLE OF THE SEED, a term ufed by botanifts, for the bafe, or thalamus, which fupports the feeds: the difc of this part is either flat, concave, convex, globular, or pyramidal; and its furface is fometimes naked, and fometimes paleaceous.

RECESSUS IMPERII, or RECESS *of the empire*, fignifies a collection of the determinations of a diet of the german empire. See DIET and EMPIRE.

RECHABITES, a kind of religious order among the antient Jews, inftituted by Jonadab, the fon of Rechab, comprehending only his own family and pofterity.

Their founder prefcribed them three things: firft, not to drink any wine; fecondly, not to build any houfes, but to dwell in tents; and thirdly, not to fow any corn, or plant vines. Thefe rules the rechabites obferved with great ftrictnefs.

RECHACING, in hunting, driving back the deer, or other beafts, into the forefts, chaces, &c. from whence they had ftrayed.

RECHANGE, or RE-EXCHANGE. See the articles RE-EXCHANGE.

At fea they ufe the term rechange for a tackle kept in referve, in cafe that already in ufe fhould fail. See TACKLE.

RECHARGE, a fecond charge or loading of a fire-arm.

The recharge fhould never be fo deep as the firft charge, left the piece, being overheated, fhould burft.

RECHEAT, in hunting, a leffon which the huntfmen play on the horn, when the hounds have loft their game, to call them back from purfuing a counter-fcent.

RECIPE, in medicine, a prefcription or remedy, to be taken by a patient; fo called becaufe always beginning with the word *recipe*, *i. e. take*; which is generally denoted by the abbreviature ℞.

For the rules proper to be obferved in forming recipes, fee PRESCRIPTION.

RECIPIANGLE, or RECIPIENT-ANGLE, a mathematical inftrument, ferving to meafure re-entering and faliant angles, efpecially in fortification.

It ufually confifts of two arms, or rulers, AC, and BC (plate CCXXVIII. fig. 4. nº 1.) rivetted together at C, and capable of being opened and clofed, like a fector. To take an angle with it, they lay the center of a protractor over the joint C, and apply its diameter to one of the rulers; then the degrees cut by the edge of the other ruler, fhew the quantity of the angle.

There are other forms of this inftrument; that reprefented *ibid.* nº 2. has a graduated circle, by which the angles may be readily meafured by its index: and nº 3. *ibid.* is another kind compofed of four equal rulers of brafs, rivetted together by their ends, fo as to form a parallelogram; and on one of the rulers is fixed a graduated femi-circle, which meafures the oppofite angle of the parallelogram, by means of one of the rulers produced, fo as to ferve inftead of an index.

RECIPIENT, the fame with receiver. See the article RECEIVER.

RECIPROCAL, in general, fomething that is mutual, or which is returned equally on both fides, or that affects both parties alike.

There are reciprocal duties between the prince and his fubjects, between the hufband and wife, &c. alfo in a phyfical fenfe, the action between the agent and patient is reciprocal: that is, the patient re-acts as much upon the agent, as this acts upon it. See RE-ACTION.

RECIPROCAL TERMS, among logicians, are thofe which have the fame fignification; and confequently are convertible, or may be ufed for each other.

RECIPROCAL VERSES, in grammar, are thofe which exprefs an action that is reflected upon the agent or agents, as,

*Ces quatre hommes s'entrebattoient.*
Thefe four men fought together.

Reciprocal verfes, in poetry, are [illegible]

run the same both forwards and backwards.

RECIPROCAL FIGURES, in geometry, those which have the antecedents and consequents of the same ratio, in both figures. Thus, in plate CCXXIX. fig. 4. the side A : B : : C : D; or 12 : 4 : : 9 : 3; that is, as much as the side A, in the first rectangle, is longer than B, so much deeper is the side C, in the second rectangle, that the side D in the first; and, consequently the greater length of the one is compensated by the greater breadth or depth of the other; for as the side A is ⅓ longer than C, so B is ⅓ longer than D, and the rectangles of course equal; that is, $A \times D = B \times C$, or $12 \times 3 = 4 \times 9 = 36$.

This is the foundation of that capital theorem, *viz.* that the rectangle of the extremes is always equal to that of the means; and, consequently, the reason of the rule of three. See RULE.

Hence it follows, that if any two triangles, parallelograms, prisms, parallelopipeds, pyramids, cones, or cylinders have their bases and altitudes reciprocally proportional, those two figures or solids are equal to each other; and *vice versa,* if they are equal, then their bases and altitudes are reciprocally proportional. See TRIANGLE, PARALLELOGRAM, *&c.*

RECIPROCAL PROPORTION, in arithmetic, is when, in four numbers, the fourth is less than the second, by so much as the third is greater than the first; and *vice versa.* See the article PROPORTION.

This is the foundation of the inverse, or indirect rule of three: thus, 4 : 10 : : 8 : 5. See the article RULE.

Reciprocal proportion is of great use in determining the laws of motion. See the article MOTION.

RECITATIVO, or RECITATIVE, in music, a kind of singing, that differs but little from ordinary pronunciation, such as that in which the several parts of the liturgy are rehearsed in cathedrals; or that wherein the actors commonly deliver themselves on the theatre at the opera, when they are to express some action or passion, to relate some event, or reveal some design.

Notwithstanding this sort of composition is noted in true time, the performer is at liberty to alter the bars of measure, and make some long and others short, as his subject requires: hence the thorough bass to the recitative is usually placed below the other, to the end that he, who is to accompany the voice, may rather observe and follow the finger, than the person that beats the time.

RECKONING, or *a ship's* RECKONING, in navigation, is that account, whereby at any time it may be known where the ship is, and on what course or courses she is to steer, in order to gain her port; and that account taken from the log-board is called the dead reckoning. See LOG-BOARD, JOURNAL, *&c.*

But as the ship's motion is liable to be disturbed from a variety of causes, such as the lee-way, variation of the compass, currents, unsteadiness of the winds, *&c.* her place, according to the dead reckoning, may be justly doubted; and therefore mariners try every way to find the latitude their ship is in, by observations of the sun or stars. See the articles LEE-WAY, VARIATION, CURRENT, WIND, and LATITUDE.

Now, if the latitude found by observation, and that found by the dead reckoning, agree, it is presumed the ship's place is well determined; but if they disagree, the account of longitude must be corrected: and for the latitude, that found by observation is always to be depended on.

In correcting the longitude found by the dead-reckoning, consider whether the difference may not have been occasioned by a current; and, if possible, make an estimate of it, as directed under the article CURRENT.

The business of correcting the dead-reckoning is a very precarious operation, and at best is little more than guessing; since there may be unknown currents, occasioned by trade-winds, the tides following the moon, stormy weather, *&c.* hence the best mariners are not able to pronounce with certainty, whether the ship may not be to the eastward or westward of the point wherein the dead-reckoning places her.

However, the following methods are those usually taken to discover her true place: 1. If the difference of latitude be much more than the departure, or the direct course has been within three points of the meridian, then the error is most likely in the distance run. 2. If the departure is much greater than the difference of latitude, or the direct course is within three points of the parallel, or more than five points from the meridian; the error may be ascribed to the course. 3. But if the courses are, in general, near the middle of

of the quadrant, the error may be either in the courſe, or in the diſtance, or in both. For to cauſe an alteration in the difference of latitude, the firſt of theſe caſes requires a greater error in the courſe, than can well be ſuppoſed to have been committed: in the ſecond caſe, the diſtances muſt be ſo faulty, as would ſcarce eſcape obſervation; and, in the third caſe, it is often doubtful, whether to attribute the error to the courſe or diſtance; and therefore it is uſually corrected in both.

As for the methods of correcting the dead-reckoning by the variation-chart, and by actually finding the ſhip's true longitude from celeſtial obſervations, ſee VARIATION and LONGITUDE.

RECLAIMING, or RECLAMING, in our antient cuſtoms, a lord's purſuing, proſecuting, and recalling his vaſſal, who had gone to live in another place without his permiſſion.

Reclaiming is alſo uſed for the demanding of a perſon, or thing, to be delivered up to the prince or ſtate to which it properly belongs; when, by any irregular means, it is come into another's poſſeſſion.

RECLAIMING, in falconry, is taming a hawk, &c. and making her gentle and familiar.

A partridge is ſaid to reclaim, when ſhe calls her young ones together, upon their ſcattering too much from her.

RECLINATION, of a plane, in dialling, the number of degrees, which a dial-plane leans backwards, from an exactly upright or vertical plane, that is, from the zenith.

The reclination is eaſily found by means of a ruler, and a quadrant; for having drawn an horizontal line on the plane by a level, or quadrant, and to it another line at right angles; apply a ruler, ſo that one end of it may hang over, or reach beyond the plane: there will a quadrant, applied to the under edge of the ruler, ſhew the degrees and minutes of the plane's reclination; accounting from that ſide of the quadrant, that is contiguous to the edge of the ruler.

RECLINER, or RECLINING DIAL. See DIAL and RECLINATION.

RECLUSE, among the papiſts, a perſon ſhut up in a ſmall cell of an hermitage, or monaſtery, and cut off, not only from all converſation with the world, but even with the houſe. This is a kind of voluntary impriſonment, from a motive either of devotion or penance.

The word is alſo applied to incontinent wives, whom their huſbands procure to be thus kept in perpetual impriſonment in ſome religious houſe.

Recluſes were antiently very numerous: they took an oath, never to ſtir out of their retreat; and having entered it, the biſhop ſet his ſeal upon the door; and the recluſe was to have every thing neceſſary for the ſupport of life, conveyed to him through a window. If he was a prieſt, he was allowed a ſmall oratory, with a window, which looked into the church, through which he was to make his offerings at the maſs, hear the ſinging, and anſwer thoſe who ſpoke to him; but this window had curtains before it, ſo that he could not be ſeen. He was allowed a little garden, adjoining to his cell, in which he might plant a few herbs, and breathe a little freſh air. If he had diſciples, their cells were contiguous to his, with only a window of communication, through which they conveyed neceſſaries to him, and received his inſtructions. If a recluſe fell ſick, his door might be opened for perſons to come in and aſſiſt him, but he himſelf was not to ſtir out.

F. Helyot gives a particular account of the ceremonies practiſed in the recluſion of a woman, in that of mother de Cambray, in the year 1625. The biſhop waited for her, early in the morning at the church-door; and upon her arrival and proſtrating herſelf at the feet of that prelate, he gave her his benediction; conducted her to the grand altar, and there bleſſed a mantle, veil, and ſcapular, put them on her and gave her a new name. Having here made her vow, and the biſhop having harangued the people in praiſe of the new recluſe, he conducted her proceſſionally to her recluſion; the clergy all the way ſinging, *Veni, ſpouſa Chriſti, &c.* Here the biſhop, bleſſing her afreſh, conſecrated the recluſion, and ſhut her up in perpetual confinement.

RECOGNITION, in law, an acknowledgement; a word particularly uſed in our law-books, for the firſt chapter of the ſtatute 1 Jac. I. by which the parliament acknowledged, that, after the death of queen Elizabeth, the crown had rightfully deſcended to king James.

RECOGNITIONE ADNULLANDA PER VIM, ET DURITIEM FACTA, in law, is a writ that

that iffues to the juftices of the common pleas, for fending a record of a recognizance, which the recognizor fuggefts to have been acknowledged by force and hard dealing; in order that if it fo appear, it may be annulled.

RECOGNIZANCE, or RECOGNISANCE, in law, a bond or obligation of record, acknowledged to the king: thus called, becaufe recognized or acknowledged in fome court of record, or before fome judge, mafter in chancery, or juftice of the peace.

There are recognizances as well for debt, as of bail, for good behaviour, and for appearance to profecute felons, &c. which laft kinds, acknowledged before juftices of the peace, are by them to be returned to the feffions, otherwife an information lies againft them.

In recognizances for bail, &c. before a juftice, the principal is bound in double the fum of the fureties, the ufual number of whom are two, and the penalty is 40 l. at leaft. Mere recognizances are not fealed, but enrolled; and execution, by force thereof, is of all the recognizor's goods or chattels (except draught-horfes and implements of hufbandry) and the moiety of his land. The execution upon a recognizance, is termed an extent. See the article EXTENT.

The party bound in a recognizance, is called recognizor; and the perfon to whom he is bound, is termed the recognizee.

Recognizance is alfo ufed in our antient ftatutes, for the verdict of the twelve jurors upon an affife; hence called recognitors.

RECOIL, or REBOUND, the ftarting backward of a fire-arm, after an explofion.

Merfennus tells us, that a cannon 12 feet in length, weighing 6400 lb. gives a ball of 24 lb. an uniform velocity of 640 feet per fecond. Putting, therefore, $W = 6400$, $w = 24$, $V = 640$, and $v =$ the velocity with which the cannon recoils; we fhall have (becaufe the momentums of the cannon and ball are equal) $Wv = wV$; and fo $v = \frac{wV}{W} = \frac{24 \times 64}{6400} = 2,4$; that is, it would recoil at the rate of $2\frac{4}{10}$ feet per fecond, if free to move. See GUNNERY and PROJECTILES.

RECOLLECTION, a mode of thinking, by which ideas fought after by the mind, are found, and brought again to view.

RECOLLECTS, a congregation of reformed franfcifcans, called alfo friersminors of St. Francis, of the ftrict obfervance. See FRANCISCAN MONKS.

RECONCILIARI, in our law-books, &c. A church is faid reconciliari, to be reconciled, when it is confecrated afrefh, after having been polluted or prophaned, as by being in the poffeffion of pagans, heretics, &c.

RECONNOITRE, in war, to view and examine the ftate and fituation of things.

RECORD, an authentic teftimony in writing, contained in rolls of parchment, and preferved in a court of record.

Records are faid to be of three kinds, *viz.* a record judicial, an attainder, &c. a record minifterial, upon oath, as an office or inquifition found; and a record made by conveyance and confent, as a fine, &c.

RECORD, among fowlers, is a bird's beginning to tune or fing, as it were within itfelf; or to perform its notes and difpofe its organs for finging. The cockthrufh is diftinguifhed from the hen in recording, the firft being more loud and frequent in it than the fecond.

RECORDARE FACIAS, a writ directed to the fheriff, to remove a caufe out of an inferior court, into the king's bench or common pleas.

RECORDER, a perfon whom the mayor and other magiftrates of a city or corporation affociate to them, for their better direction in matters of juftice, and proceedings in law; on which account this perfon is generally a counfellor, or other perfon well fkilled in the law.

The recorder of London is chofen by the lord mayor and aldermen; and, as he is held to be the mouth of the city, he delivers the judgment of the courts therein and records and certifies the city cuftoms.

RECORDO ET PROCESSO MITTENDIS, is a writ to call a record, together with the whole proceedings in a caufe, out of an inferior court into the king's court.

RECOVERY, in law, is obtaining any thing by judgment or trial at law.

Recoveries are of two kinds, a true recovery and a feigned or common one. A true recovery is the actual recovering of any thing, or its value, by judgment and trial at law: as where a perfon is fued for land, or other things real and perfonal, and obtains a verdict in his favour.

A feigned or common recovery, is a formal act by confent, made ufe of for the better fecuring of lands, tenements, &c. the end and effect of which is, to dock and deftroy eftates-tail, remainders, and reverfions,

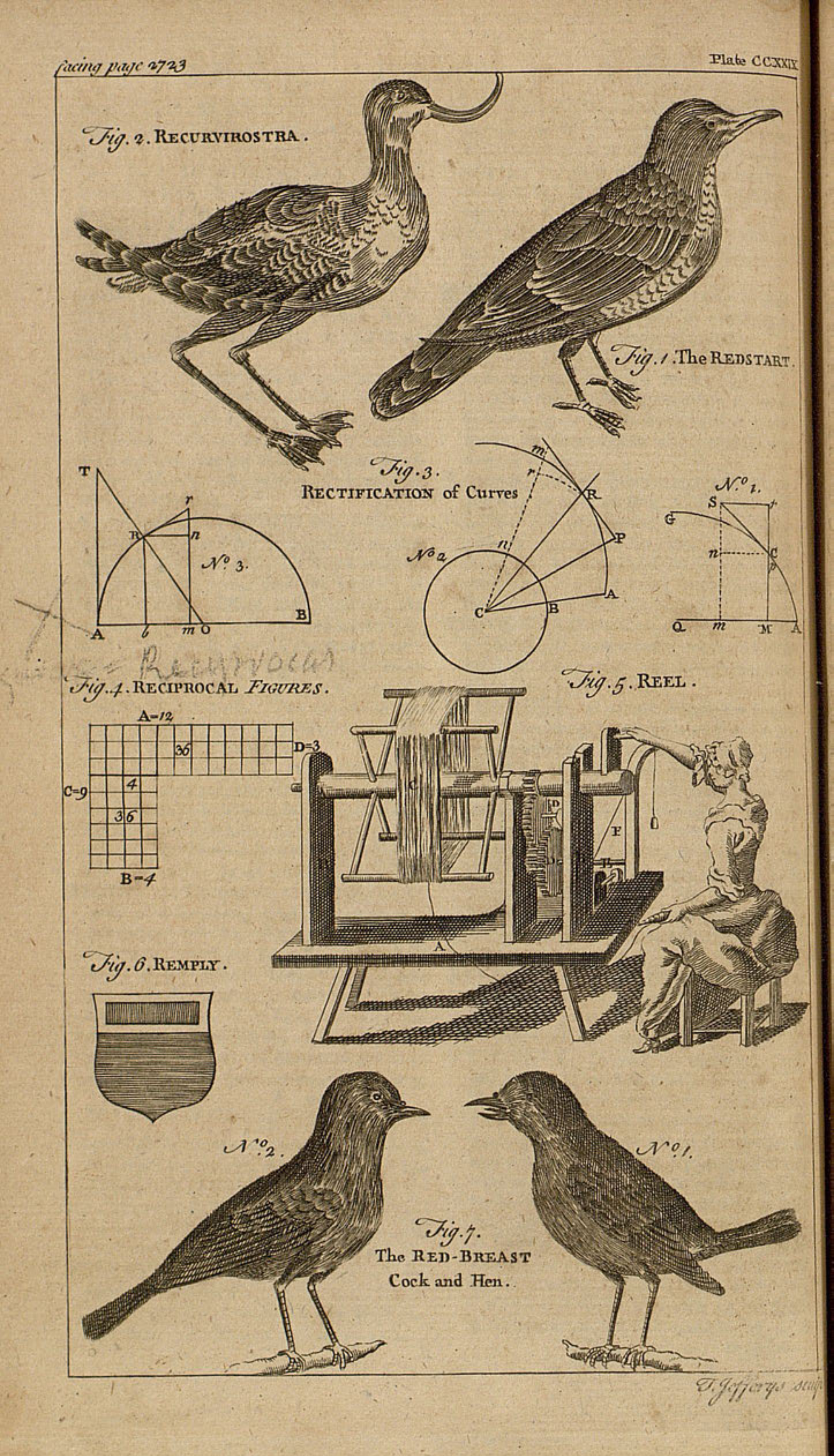


Fig. 2. RECURVIROSTRA.
Fig. 1. The REDSTART.
Fig. 3.
RECTIFICATION of Curves
No 1.
No 2
No 3.
T
r
R
n
A
b
m
O
B
m
P
A
C
S
G
Q
M
Fig. 4. RECIPROCAL FIGURES.
A=12
36
D=3
C=9
4
36
B=4
Fig. 5. REEL.
Fig. 6. REMPLY.
No 2.
No 1.
Fig. 7.
The RED-BREAST
Cock and Hen.
T. Jefferys sculp.

reverſions, and to bar the former owners. In a common recovery, there muſt be at leaſt three parties, *viz.* the demandant, tenant, and vouchee: the demandant is the perſon that brings the writ of entry, and therefore may be termed the recoveror; the tenant is he againſt whom the writ is brought, who may be termed the recoveree; and the vouchee is the perſon whom the tenant vouches, or calls to warrant for the lands demanded: thus, when a perſon is deſirous to cut off an eſtate-tail in lands, &c. he cauſes a feigned writ of entry ſur diſſeiſin en le port to be brought by ſome friend, who is the demandant, for thoſe lands, &c. who in a feigned declaration thereupon made, pretends that he was diſſeiſed by him, who, by a feigned fine, or deed of bargain and ſale, is named and ſuppoſed to be the tenant of the land: this feigned tenant, if it be a ſingle recovery, is made to appear and vouch to warranty the crier of the court of common pleas, or the bag-bearer of writs to the cuſtos brevium in that court, who is termed the common vouchee, and is ſuppoſed to warrant the title; but he making default, a judgment is by this fiction entered, that the demandant ſhall recover, and have a writ of ſeiſin for the poſſeſſion of the lands in queſtion; and that the tenants ſhall recover the value of the lands againſt the common vouchee: though this recovery in value is only imaginary, yet it is looked upon as a bar to the intail for ever.

RECREMENT, in chemiſtry, ſome ſuperfluous matter ſeparated from ſome other that is uſeful: in which ſenſe it is the ſame with ſcoriæ, fæces, and excrements. See the article SCORIA, &c.

RECRIMINATION, in law, an accuſation brought by the accuſed againſt the accuſer, upon the ſame fact. See the article ACCUSATION.

RECRUITS, in military affairs, new-raiſed ſoldiers, deſigned to ſupply the place of thoſe who have loſt their lives in the ſervice, or are diſabled by age or wounds. See the article SOLDIER.

RECTANGLE, in geometry, the ſame with a right-angled parallelogram. See the article PARALLELOGRAM.

In arithmetic and algebra, a rectangle ſignifies the ſame with factum or product. See the articles PRODUCT and MULTIPLICATION.

RECTANGLED, RECTANGULAR, or RIGHT-ANGLED, appellations given to figures and ſolids which have one or more right-angles: thus a triangle with one right angle, is termed a rectangled triangle; alſo parallelograms with right angles, ſquares, cubes, &c. are rectangular.

Solids, as cones, cylinders, &c. are alſo ſaid to be rectangular, with reſpect to their ſituation, when their axis are perpendicular to the plane of the horizon.

The antient geometricians always called the parabola, the rectangular ſection of a cone. See the articles CONIC SECTIONS and PARABOLA.

RECTIFICATION, the art of ſetting any thing to rights: and hence, to rectify the globes, is to fit them for performing any problem. See GLOBE.

RECTIFICATION, in geometry, is the finding a right line, equal in length to a curve. See the article CURVE.

The rectification of curves is a branch of the higher geometry, where the uſe of the inverſe method of fluxions, is very conſpicuous.

Caſe I. Let A C G (pl. CCXXIX. fig. 3. n° 1.) be any kind of curve, whoſe ordinates are parallel to themſelves, and perpendicular to the axis A Q. Then if the fluxion of the abſciſs A M be denoted by $Mm$, or by $Cn$, (equal and parallel to $Mm$) and $nS$, equal and parallel to $Cr$, be the repreſentation of the correſponding fluxion of the ordinate M C; then will the diagonal C S, touching the curve in C, be the line which the generating point $p$, would deſcribe, were its motion to become uniform at C; which line, therefore, truly expreſſes the fluxion of the ſpace A C, gone over. See the article FLUXION.

Hence, putting $AM = x$, $CM = y$, and $AC = z$; we have $\dot{z}$ $(= CS = \sqrt{Cn^2 + Sn^2} = \sqrt{\dot{x}^2 + \dot{y}^2}$; from which, and the equation of the curve, the value of $z$ may be determined. Thus, let the curve propoſed be a parabola of any kind, the general equation for which is $x = \dfrac{y^n}{a^{n-1}}$; and hence $\dot{x} = \dfrac{ny^{n-1}\dot{y}}{a^{n-1}}$, and therefore $(= \dot{z}\sqrt{\dot{y}^2 + \dot{x}^2}) = \sqrt{\dot{y}^2 + \dfrac{n^2 y^{2n-2}\dot{y}^2}{a^{2n-2}}} = \dot{y} \times \overline{1 + \dfrac{n^2 y^{2n-2}}{a^{2n-2}}}\Big|^{\frac{1}{2}}$;

the

the fluent of which, univerſally expreſſed in an infinite ſeries, is $y + \frac{n^2 y^{2n-1}}{\overline{2n-1} \times 2a^{2n-2}} - \frac{n^4 y^{4n-3}}{\overline{4n-3} \times 8a^{4n-4}} + \frac{n^6 y^{6n-5}}{\overline{6n-5} \times 16a^{6n-6}}$ &c $= z$.

Caſe II. Let all the ordinates of the propoſed curve A R M (*ibid.* nº 2.) be referred to a center C: then, putting the tangent R P (intercepted by the perpendicular C P) $= t$, the arch, B N, of a circle, deſcribed about the center C, $= x$; and the radius C N (or C B) $= a$; we have $\dot{z} : \dot{y} :: y$ (CR) : $t$ (RP); and, conſequently, $\dot{z} = \frac{y\dot{y}}{t}$: from whence the value of $z$ may be found, if the relation of $y$ and $t$ is given. But, in other caſes, it will be better to work from the following equation, *viz.* $\dot{z} = \sqrt{\dot{y}^2 + \frac{y^2\dot{x}^2}{a^2}}$, which is thus derived; let the right line C R, be conceived to revolve about the center C; then ſince the celerity of the generating point R, in a direction perpendicular to C R, is to ($\dot{x}$) the celerity of the point N, as C R ($y$) to C N ($a$), it will therefore be truly repreſented by $\frac{y\dot{x}}{a}$; which being to ($\dot{y}$) the celerity in the direction of C R, produced as C B ($s$) : R P ($t$), it follows that $\frac{y^2\dot{x}^2}{a^2} : \dot{y}^2 :: s^2 : t^2$; whence, by compoſition, $\frac{y^2\dot{x}^2}{a^2} + \dot{y}^2 : \dot{y}^2 :: s^2 + t^2 (y^2) : t^2$; therefore $\frac{y^2\dot{x}^2}{a^2} + \dot{y}^2 = \frac{y^2\dot{y}^2}{t^2}$, and conſequently $\sqrt{\frac{y^2\dot{x}^2}{a^2} + \dot{y}^2} \left(= \frac{y\dot{y}}{t}\right) = \dot{z}$. Q. E. D.

But the ſame concluſion may be more eaſily deduced from the increments of the flowing quantities: for, if R $m$, $r m$, and N $u$ be aſſumed to repreſent ($\dot{z}, \dot{y}, \dot{x}$) any very ſmall correſponding increments of A R, C R, and B N; then will C N ($a$) : C R ($y$) : : $\dot{x}$ (the arch N$n$) : the ſimilar arch R $r = \frac{y\dot{x}}{a}$. And if the triangle R $r$ $m$ (which, while the point $m$ is returning back to R, approaches continually nearer and nearer to a ſimilitude with C R P) be conſidered as rectilinear, we ſhall alſo obtain $\dot{z}^2$ ($=$ R $m^2 =$ R $r^2 + r m^2$) $= \frac{y^2\dot{x}^2}{a^2} + \dot{y}^2$; and $\sqrt{\frac{y^2\dot{x}^2}{a^2} + \dot{y}^2} \left(= \frac{y\dot{y}}{a}\right) = \dot{z}$, as before.

Now from the right ſine, verſed ſine, tangent, or ſecant of an arch of a circle O A R B (*ibid.* nº 3.) given: to find the length of the arch itſelf, in terms thereof. Put the verſed ſine A B $= x$, the right ſine R $b = y$, the tangent A T $= t$, the ſecant O T $= s$, the arch A R $= z$, and the radius A O, or R O $= a$; alſo let R $n = \dot{x}$, $nr = \dot{y}$, and R $r = \dot{z}$: then, ſince ∟$rn$R ($=$ a right angle) $=$ ∟O $b$ R, and $r$ R $n =$ O R $b$, the triangles $r$ R $n$, and OR$b$, are equiangular; and R$b$($y$) : OR ($a$) : : R$n$ ($\dot{x}$) : R$r$ ($\dot{z}$) $= \frac{a\dot{x}}{\sqrt{2ax - xx}}$; becauſe, by the property of the circle, $y = \sqrt{2ax - xx}$. Alſo, O $b$ ($\sqrt{a^2 - y^2}$) : OR ($a$) : : $nr$ ($\dot{y}$) : R $r$ ($\dot{z}$) $= \frac{a\dot{y}}{\sqrt{a^2 - y^2}}$. Theſe two values exhibit the fluxion of the arch, in terms of the verſed ſine and right ſine, reſpectively: and to get the ſame in terms of the tangent and ſecant, we have O T ($= s = \sqrt{a^2 + t^2}$) : O A ($a$) : : O R ($a$) : O $b = \frac{a^2}{s} = \frac{a^2}{\sqrt{a^2 + t^2}}$. Hence A $b = a - \frac{a^2}{s} = a - \frac{a^2}{\sqrt{a^2 + t^2}}$, whoſe fluxion $= \frac{a^2\dot{s}}{s^2} = \frac{a^2 + t\dot{t}}{\overline{a^2 + t^2})^{\frac{2}{3}}}$; whence A T ($= \sqrt{s^2 - a^2} = t$) : O T ($= s = \sqrt{a^2 + t^2}$) : : R $n$ : R $r = \frac{a^2\dot{s}}{s\sqrt{s^2 - a^2}} = \frac{a^2\dot{t}}{a^2 + t^2} = \dot{z}$.

Now from any one of theſe forms of fluxions, *viz.* $\frac{a\dot{x}}{\sqrt{2ax - xx}}$, $\frac{a\dot{y}}{\sqrt{a^2 - y^2}}$, $\frac{a^2\dot{t}}{a^2 + t^2}$, and $\frac{a^2\dot{s}}{s\sqrt{s^2 - a^2}}$, the value of the arch itſelf (by taking the fluent in an infinite ſeries) may be found. But the third form, expreſſed in terms of the tangent, being entirely free from radical quantities, will be the moſt ready in practice, eſpecially where the required arch is but ſmall, though the ſeries, ariſing from the firſt form, always converges faſteſt.

If, therefore, $\frac{a^2\dot{t}}{a^2 + t^2}$ be converted into an

an infinite series, we shall have $\dot{z} = \dot{t} - \frac{t^2\dot{t}}{a^2} + \frac{t^4\dot{t}}{a^4} - \frac{t^6\dot{t}}{a^6} +$, &c. and consequently, $z = t - \frac{t^3}{3a^2} + \frac{t^5}{5a^4} - \frac{t^7}{7a^6} + \frac{t^9}{9a^3}$ — &c. = AR. Now if, for example, we suppose AR = 30°, and AO (to render the operation more easy) = unity, we shall have $t = \sqrt{\frac{1}{3}} = .5773502$; because $Ob\left(\sqrt{\frac{3}{4}}\right) : bR\left(\frac{1}{2}\right) :: OA(1) : AT(t) = \frac{1}{3}$. Whence $t^3 = .1924500$, $t^5 = .0641500$, $t^7 = .0213833$, $t^9 = .0071277$, &c. And therefore $AR = .5773502 - \frac{.1924500}{3} + \frac{.0641500}{5} - \frac{.0213833}{7} + \frac{.0071277}{9}$ — &c. = .5235987; which, multiplied by 6, gives 3.141592, &c. for the length of the semi-periphery of a circle whose radius is 1.

RECTIFICATION, in chemistry, is nothing but the repetition of a distillation, or sublimation several times, in order to render the substance purer, finer, and freer from aqueous or earthy parts.

The perfection of rectifying spirits, according to Dr. Shaw, depends upon finding out a simple method of separating all the oil and water from it; and, he observes, that the great affinity betwixt the essential oil and spirit, is the physical cause of the difficulty found in the rectification of brandies. He recommends the way of working from a spirit largely diluted with water, into water again; whereby the essential oil would, at one operation, be doubly separated. See the articles DISTILLATION, ALCOHOL, SPIRIT, &c.

RECTIFIER, in navigation, an instrument consisting of two parts, which are two circles either laid one upon, or let into, the other, and so fastened together in their centers, that they represent two compasses, one fixed, the other moveable; each of them divided into the thirty-two points of the compass, and three hundred and sixty degrees, and numbered both ways, from the north and the south, ending at the east and west, in ninety degrees.

The fixed compass represents the horizon, in which the north and all the other points of the compass are fixed and immoveable. See HORIZON.

The moveable compass represents the mariners compass, in which the north and all other points are liable to variation. See COMPASS.

In the center of the moveable compass is fastened a silk thread, long enough to reach the outside of the fixed compass. But, if the instrument be made of wood, there is an index instead of the thread.

Its use is to find the variation of the compass, to rectify the course at sea; having the amplitude or azimuth given.

RECTIFIER, in the distillery, the person whose employment it is to take the coarse malt-spirit of the malt-stiller, and re-distil it to a finer and better liquor. The art of the rectifier, according to Dr. Shaw, might be entirely set aside, if the malt-stiller could make his spirit perfect at the second operation; which seems very practicable, if the malt-stillers could be got to forsake their old track. The great things to be recommended for the improvement of their art, would be first the brewing in perfection, and secondly the keeping their wash after the manner of stale beer, till it has entirely lost its malt-flavour, and acquired a pungent, acid vinosity; and then, thirdly, leaving out the lees, to distil with a well regulated fire. It is scarce to be thought how pure a spirit is to be obtained from malt this way: but the great art would be, the finding a way to make malt-liquors artificially stale, bright, and flavourless, though otherwise vinous.

RECTIFYING *the globe*. See GLOBE.

RECTILINEAR, in geometry, right-lined; thus figures whose perimeter consists of right lines, are said to be rectilinear.

RECTITUDE, *rectitudo*, in philosophy, refers either to the act of judging or of willing; and therefore whatever comes under the denomination of rectitude is either what is true or what is good; these being the only objects about which the mind exercises its two faculties of judging and willing.

Moral rectitude, or uprightness, is the chusing and pursuing those things which the mind, upon due enquiry and attention, clearly perceives to be good; and avoiding those that are evil.

RECTO, in law, usually termed a writ of right, is of so high a nature, that while other writs in real actions are only for the recovery of the possession of the lands, &c. in question, this writ tends to recover both the seisin and the property; by which means both the rights of posses-

poſſeſſion and property are tried together. There are two kinds of this writ, *viz.* a writ of right patent, ſo called becauſe it is ſent open; it lies for him that has the fee ſimple in the lands, *&c.* ſued for, againſt a tenant of the freehold at leaſt: the other is a writ of right-cloſe, and lies where a perſon holds lands or tenements by charter in antient demeſne, in fee-ſimple, fee-tail, for term of life, or in dower, and is diſſeiſed. This writ is directed to the king's manors, or to the lord of an antient demeſne, commanding him to do right in his court.

Recto, or right, is alſo prefixed to the title of ſeveral other writs: as 1. *Recto de advocatione eccleſiæ*, which is a writ of right that lies where a perſon has right of advowſon in fee to him and his heirs; and the incumbent dying, a ſtranger preſents his clerk to the church; and he, not having brought this action of *quare impedit*, *&c.* within ſix months, has ſuffered the ſtranger to uſurp upon him. 2. *Recto de dote*, a writ of right of dower, which lies for a woman who has received part of her dower, and demands the remainder againſt the heir of her deceaſed huſband, or his guardian. 3. *Recto de dote unde nihil habet*, a writ of right that lies where a huſband having lands or tenements, has aſſigned a dower thereof to his wife, on which account ſhe is driven to ſue the heir, or his guardian, for her thirds. 4. *Recto quando dominus remiſit*, is a writ of right which lies where lands, *&c.* in the ſignory of any lord, are demanded by a writ of right. Thus if the lord hold no court, or, at the prayer of the demandant or tenant, ſend his writ to the king's court, to carry the cauſe thither, this writ iſſues for the other party. 5. *Recto de rationabili parte*, a writ of right patent, that lies between privies in blood; as brothers in gavel-kind, ſiſters, or other coparteners for land in fee-ſimple, demanding a certain portion of it to hold in ſeveralty. 6. *Recto ſur diſclaimer*, a writ which lies where a lord, in the court of common pleas, avows upon his tenant, and the tenant diſclaims to hold of him; upon which the lord may bring this writ.

RECTOR, a term applied to ſeveral perſons whoſe offices are very different: as, 1. The rector of a pariſh is a clergyman that has the charge and cure of a pariſh, and poſſeſſes all the tythes, *&c.* 2. The ſame name is alſo given to the chief elective officer in ſeveral foreign univerſities, particularly in that of Paris. 3. Rector is alſo uſed in ſeveral convents for the ſuperior officer who governs the houſe: and the jeſuits give this name to the ſuperiors of ſuch of their houſes as are either ſeminaries or colleges.

RECTORY, a pariſh-church, parſonage, or ſpiritual living, with all its rights, tythes and glebes.

Rectory is alſo ſometimes uſed for the rector's manſion or parſonage-houſe.

RECTUM, in anatomy, the third and laſt of the large inteſtines, or guts. See the article INTESTINES.

The rectum is in length about three hands breadth, and its diameter about three fingers. It has its beginning at the loweſt vertebræ of the loins, and at the lower end is the anus. See ANUS.

It is connected to the os ſacrum, the os coccygis, and the urinary bladder in men; but in women to the vagina uteri. The coats of the rectum are more thick and fleſhy than thoſe of any other of the inteſtines: it has in general no valves, but it has ſeveral rugæ: the abſence of valves here, is to prevent the expulſion of the fœces from being retarded.

RECTUS, in anatomy, a name common to ſeveral pair of muſcles, ſo called on account of the ſtraightneſs of their fibres, as, 1. The rectus major anticus, which ariſes from the tranſverſe apophyſes of the five lower vertebræ of the neck, and is inſerted in the os occipitis. 2. The rectus minor anticus, called, by Cowper, muſculus annuens: this ariſes from the anterior ſurface of the atlas, or firſt vertebra of the neck; and lies concealed, as it were, under the former, till it is at length inſerted a little behind it, into the os occipitis: theſe two pair of muſcles ſerve to move the head forward. 3. The rectus major poſticus, one of the extenſors of the head, which has its origin from the ſpinoſe apophyſis of the epiſtrophæus, and is inſerted into the os occipitis. 4. The rectus minor poſticus, which is alſo one of the five extenſors of the head, has its riſe from the poſterior part of the atlas, and its end under the former. 5. The rectus lateralis, which ſerves to bend the head on one ſide, has its origin from the upper ſurface of the tranſverſe apophyſis of the atlas: from this it aſcends ſtrait with a ſhort body, but conſiderably thick; and is inſerted partly into the os occi-

occipitis, and partly into the temporal bone, near the incisure of the mastoide process. 6. The rectus tibiæ, one of the four extensors of the leg, which has its origin from the anterior and inferior spine of the ileum.

RECTUS IN CURIA, in law, one who stands at the bar, and no man objects any thing against him. So also when a person who has been outlawed has reversed the outlawry, and can partake of the benefit of the law, he is said to be rectus in curia.

RECURRENTS, in anatomy, a name given to several large branches of nerves sent out by the par vagum from the upper part of the thorax to the larynx. See the article NERVES.

RECURRENT VERSES, are the same with those called reciprocal. See the article RECIPROCAL.

RECURVIROSTRA, in ornithology, a genus of the scolopaces order of birds, the beak of which is of a depressed or flatted figure, and is pointed at the extremity and bent upwards: it is about the size of our common lapwing, or a little larger; its colour is variegated, black and white; the figure of its beak is extremely singular, being long, black throughout, flatted, and appears to be of a coreaceous substance rather than of a horny one, like that of the beaks of other birds; and its bending upwards in a part of a circle is also singular. See plate CCXXIX. fig. 2.

There is another species common in England, with a yellow breast, about the size of the common pigeon.

RECUSANTS, such persons as acknowledge the pope to be the supreme head of the church, and refuse to acknowledge the king's supremacy; who are hence called popish recusants. These are in England charged with double taxes, not merely as romanists but as recusants.

RECUSATION, the desiring a judge to refrain from judging in a certain cause, on account of his kinship, capital enmity, *&c.* to one of the parties.

By the french law, kinship within the fourth degree, whether of consanguinity or alliance, is deemed a legal cause of recusation; as also the judge's being godfather, *&c.* of one of the parties.

RED, in physics, one of the simple or primary colours of natural bodies, or rather of the rays of light. See the articles COLOUR, LIGHT, and RAY.

The red rays are those which of all others are the least refrangible: hence, as Sir Isaac Newton supposes, the different degrees of refrangibility arise from the different magnitudes of the luminous particles whereof the rays consist, the red rays, or red light, is concluded to be that which consists of the largest particles. Authors distinguish three general kinds of red: one bordering on the blue, as columbine, or dove-colour, purple, and crimson. Another bordering on yellow, as flame colour and orange; and between these extremes is a medium, partaking neither of the one nor the other, which is what we properly call red. Mr. Boyle observes that red is an obvious, and generally a pleasing colour; and that antiently it was customary to present red objects to elephants, to render them more fierce; and that the same colour irritates turky-cocks. He observes also, that among the several changes of colour which bodies acquire, or disclose, by digestion, it is very remarkable to find a redness rather than any other colour in most tinctures; and even in the more gross solutions made of almost all concretes that abound either with mineral or vegetable sulphur, though the menstruum employed about these solutions or tinctures be never so limpid.

RED, in dying, is one of the five simple or mother colours; some reckon six kinds or casts of red, *viz.* scarlet red, crimson-red, madder-red, half-grain-red, lively-orange-red, and scarlet of cochineal: but they may be all reduced to the three following, according to the three principal drugs which give the colours: *viz.* the kermes, cochineal and madder. See the articles KERMES, COCHINEAL, and MADDER.

For the scarlet and crimson reds, see the articles SCARLET and CRIMSON.

Madder-red is made with madder, to which some add realgal and arsenic; others common salt, or other salts, with wheat-flour; or agaric, with spirit of wine, galls, or turmeric. The half-grain is made with agaric and bran water; half-scarlet-grain, half madder, and sometimes turmeric. As to the lively orange-red, the stuff must be first put in yellow, then in a liquor made of goats-hair, which has been boiled several times with madder, and now dissolved over the fire with certain acids, as urine, tartar, *&c.*

Besides these reds, which are good and allowed colours, there is also a brazil-

 red,

red, which is difcouraged as fading eafily. Of the fix good reds only four have particular cafts or fhades, the madder-red, the crimfon-red, the lively-orange-red, and the fcarlet of cochineal: the cafts or fhades of crimfon are frefh-colour, peach-colour, carnation-rofe-colour, and an apple-tree flower colour; Thofe of madder are frefh-colour, onion-peel-colour, and flame-colour; thofe of the orange are the fame with that of the crimfon; fcarlet, befides the fhades of all the reft, has fome peculiar to itfelf, as cherry-colour, fire-colour, &c.

Red, in painting. For painting in oil-colours, they ufe a red called cinnabar, or vermillion, and another called Lacca. See the articles Cinnabar and Lacca. In limning and frefco, for a violet red, inftead of lacca they ufe reddle, a natural earth found in England: for a brown, they ufe ochre. See the articles Reddle and Ochre.

Red, in heraldry. See Gules.

Red, in cofmetics, a fucus, or paint, wherewith the ladies enliven their cheeks and lips. There are two kinds of thefe reds, one in leaves called fpanifh red; the other a liquor which is an extract of a fcarlet dye. See Cosmetic.

Red is an epithet ufed in the englifh names of feveral birds, as the red-game, red-fhank, red-ftart, red-breaft, red-wing, &c.

The red-game is a fpecies of the tetrao, common in the mountains of Yorkfhire, and fome other of the northern counties, It is of the fhape of a partridge, but much larger, and of a mixed colour of red and black, and is feathered down to the ends of the toes. See Tetrao.

The red-fhank is a fpecies of the tringa, called by authors gallinula erythropus, and callidrys, and is about the fize of the common plover. The back is of a greyifh or brownifh-green, ufually fpotted with black; its neck grey, and its throat variegated with black and white: the breaft is white, with a few loofe ftreaks of black; the wing-feathers are variegated with black, brown, and white; the beak is two fingers breadth long, flender, and fhaped like the beak of a woodcock, redifh at the bafe, and blackifh lower down: its legs are of a fine beautiful red, and the hinder toe is very fhort and fmall.

The red-ftart a fpecies of the motacilla, with a black throat and reddifh belly, is of the fize of a chaffinch, but flenderer in proportion to its thicknefs; the head is fmall, and fomewhat depreffed; the eyes are large; the beak is flender, oblong, and of a dark colour; the head, the neck, and the beak, are of a bright grey; the anterior part of the head is white; the throat and fides of the head under the eyes are black; the breaft is of a reddifh colour, as are alfo the rump and the tail. See plate CCXXIX. fig. 1.

The red-breaft is alfo of the fpecies of the motacilla, with the throat and breaft reddifh; it is of the fize of the nightingale; the head is pretty large and rounded; the eyes are bright and fmall; the beak flender and brown; the head, neck, and back, are of a pale olive-brown, with a tinge of grey; the throat and breaft are throughout of a tawny colour, approaching to reddifh; the belly is white; the wings and tail of the fame brownifh colour, as are alfo the legs and feet. See plate CCXXIX. fig. 7. where n° 1. is the cock, and n° 2. the hen.

The red-wing is a fpecies of the turdus, with a white breaft. It is fmaller than the common thrufh; the head is fmall and flatted; the eyes are bright; the iris of a deep hazel; the ears are patulous, and the beak brown, with fome admixture of yellow: the head, neck, and back, are of a dufky-grey; the fides and under parts of the wings are of an orange-colour, approaching to red; the breaft, belly, and throat, are white; the feet are of a paler colour.

Red-russia, or Little-russia, a province of Poland, bounded by the province of Polefia; on the north, by Volhinia and Podolia on the eaft; by the Carpathian mountains, which divide it from Tranfilvania and Hungary, on the fouth; and by the province of Little Poland, on the weft; being two hundred miles long, and one hundred broad.

Red-sea feparates Afia from Africa.

Red-book of the Exchequer, an antient record or manufcript volume, in the keeping of the king's remembrancer, containing divers mifcellany treatifes relating to the times before the conqueft.

REDDENDUM, in our law, is ufed fubftantively for the claufe in a leafe wherein the rent is referved to the leffor. The proper place for it is next after the limitation of eftate.

REDDIDIT se, in law, is where a perfon procures bail to action, and the party that is bailed, any time before the return of

of the second scire facias against the bail, renders himself in their discharge: such bail are thereby discharged. On a reddidit se, the defendant's attorney is to give notice of the render to the plaintiff's attorney, and make oath of such notice, *&c.* Also the bail piece must be discharged, otherwise the plaintiff may notwithstanding proceed to judgment and execution against the bail; for till that is done there is a record still remains in court against them.

REDDITARIUM was antiently used for the rental of a manor, or other estate; as was

REDDITARIUS, a renter or tenant.

REDDITION, *redditio,* a surrendering or restoring. In law it also denotes a judicial acknowledgment that a thing in question belongs to the demandant.

REDDLE, a soft, heavy, red marle, of great use in colouring; and being washed and freed from its sand, is often sold by our druggists under the name of bole-armenic. See the article MARLE.

REDEEMABLES, are lands, funds, *&c.* sold with a reservation of the equity of redemption. See REDEMPTION.

REDELIVER, in law, the yielding and delivering a thing back, which in case of a robbery, *&c.* does not purge the offence.

REDEMISED signifies the granting back of lands demised or leased.

REDEMPTION, in law, a faculty or right of re-entering upon lands, *&c.* that have been sold and assigned, upon reimbursing the purchase money with legal costs. Bargains wherein the faculty, or, as some call it, the equity of redemption is reserved, are only a kind of pignorative contracts. A certain time is limited within which the faculty of redemption shall be exercised, and beyond which it shall not extend.

In our old law writers, redemption denoted some grievous mulct, imposed by way of commutation for the head or life of the delinquent.

REDENS, REDANS, or REDANT, in fortification, a kind of work indented in form of the teeth of a saw, with saliant and re-entering angles, to the end that one part may flank or defend another. It is called saw-work and indented-work. The faces in this flank one another. Redens are frequently used in the fortifying of walls, where it is not necessary to be at the expence of building bastions; as when they stand on the side of a river, a marsh, the sea, *&c.*

REDHIBITION, *redhibitio,* in the civil-law, an action allowed a buyer, whereby to annul the state of some moveable, and oblige the seller to take it back again, upon the buyer's finding it damaged; or that there was some personal cheat, *&c.* The redhibition, or redhibitory action, has place in several cases in the body of the civil law. If a horse was sold that had the glanders, was broken-winded, or foundered, it was a redhibitory case; and the buyer would be obliged to take him again within nine days.

REDINTEGRATION, *redintegratio,* in the civil law, the act of restoring a person to the enjoyment of a thing whereof he had been illegally dispossessed.

REDINTEGRATION, in chemistry, the restoring of any mixt body or matter, whose form has been destroyed by calcination, corrosion, sublimation, or the like, to its former nature and constitution.

REDISSEISIN, in law, signifies a disseisin made by one who once before was found adjudged to have disseised the same person of his lands and tenements; in which case there lies a special writ called redisseisin. This writ may be brought against the person who committed the fresh-disseisin, and against another that was not a disseisor, in case he be a tenant of the lands; and if after a recovery upon this writ, the party is disseised again, by him who made the first redisseisin, he shall have a new writ, and so every time he is redisseised. On the fact being proved by the sheriff's inquisition, the offender is to be imprisoned, and the land reseised.

REDOUBT, or REDOUTE, *reductus,* in fortification, a small square fort, without any defence but in front, used in trenches, lines of circumvallation, contravallation, and approach, as also for the lodgings of corps de gard, and to defend passages. In marshy grounds, redoubts are frequently made of stone-works, for the security of the neighbourhood; their face consists of from ten to fifteen fathom, the ditch round them from eight to nine feet broad and deep, and their parapets have the same thickness.

REDRESSING, the rectifying or setting any thing strait again.

In a moral sense, to redress grievances is to reform and remove them.

To redress a stag, among hunters, is to put him off his changes.

RED-

REDRUTH, a market-town of Cornwall, ſituated fifty miles ſouth-weſt of Launceſton.

REDUBBORS, thoſe who buy ſtolen cloths, *&c.* and, to the end they may not be known, convert them into ſome other form, or change the colour, *&c.*

REDUCE, in chemiſtry, the ſame with reduct. See the article REDUCT.

REDUCE *a place*, among military men, is to oblige the governor to ſurrender it to the beſiegers by capitulation.

REDUCT, or REDUIT, a military term ſignifying an advantageous piece of ground entrenched, and ſeparated from the reſt of the place, camp, *&c.* for an army, garriſon, *&c.* to retire to in caſe of a ſurprize.

REDUCT, in building, a quirk or little place taken out of a larger to make it more uniform and regular; or for ſome other convenience, as for a little cabinet a ſide of a chimney, for alcoves, *&c.*

REDUCT, or REDUX, among chemiſts, a powder by which calcined metals and minerals are again reduced to their regulus, or pure ſubſtance. See REGULUS.

REDUCTION, *reductio*, in the ſchools, a manner of bringing a term or propoſition which was before oppoſite to ſome other, to be equivalent to it. This is effected by the addition or retrenchment of a negative particle: thus, to reduce this propoſition, *no man is an animal*, to be equivalent to its oppoſite, *every man is an animal*; I drop the negative and ſay, *man is an animal*. After the like manner might the term, *every man*, be reduced, by adding the negative, and ſaying, *there is no man*.

Reduction of propoſitions is uſed in a more general ſenſe for any expreſſion of one propoſition by another propoſition equivalent thereto. To a reduction, therefore, there are two propoſitions required; the reduced, and the reducing, which are conſidered as the extremes thereof, and to be connected in the reduction, by means of the particle, *that is*, which here has the effect of a copula. As here, *only animals think*; *that is, animals think, and nothing beſides animals thinks*; where the propoſition preceding the particle, *that is*, is reduced, and the ſubject of the reduction; that following reduces the particle, and acts as the predicate of reduction; and the particle, *that is*, acts as a copula, importing not barely that the propoſition is expreſſed by another, but by another equivalent one, or, as it were, the ſame.

REDUCTION *of ſyllogiſms*, is a regular changing or transforming of an imperfect ſyllogiſm into a perfect one; or it is a change of a ſyllogiſm in reſpect of form, whereby the neceſſity of the illation or inference is made more evident. See the article SYLLOGISM.

Reduction obtains in ſyllogiſms of the ſecond and third figure, and alſo in the indirect modes of the firſt. By it theſe are all brought to the firſt. There are two kinds of this reduction; the one direct, or oſtenſive, performed merely by a converſion of one or both the premiſes, or by a tranſpoſition thereof, as when *cameſtres* is reduced to *celarent*. The other indirect, called per impoſſibile, or ad abſurdum, whereby the perſon who denies the goodneſs or legitimacy of an imperfect ſyllogiſm, is reduced to aſſert or grant ſomething abſurd and impoſſible, or contradictory, to ſome other thing maintained by him: ſuppoſe, *e. gr.* a perſon, granting the premiſes of the following ſyllogiſm, denies the concluſion. *All fraud is prohibited, but ſome trading is not prohibited: therefore ſome trading is not fraud.* We thus proceed againſt him; if the ſyllogiſm is not good, the antecedent is juſt, but the conſequent falſe; and therefore the contrary of the concluſion muſt be true. Now I take the contrary of the concluſion, which you thus give, viz. *all trading is fraud*, and of that, with the other premiſe of the former ſyllogiſm. *viz.* the major, which you likewiſe grant, I make a new ſyllogiſm; thus, *all fraud is prohibited*; *all trading is fraud*; *therefore all trading is prohibited.* But this propoſition, *all trading is prohibited*, and the other, *ſome trading is prohibited*, which you granted me in the firſt ſyllogiſm, are contradictories.

REDUCTION, in arithmetic, that rule whereby numbers of different denominations are brought into one denomination. Reduction is but the application of multiplication and diviſion. For, firſt, a higher denomination is brought into a lower one, by multiplying the higher denomination with ſo many of the lower, as are contained in the higher; ſtill keeping them equivalent in value. This is called reduction deſcending. Secondly, a lower or inferior denomination is reduced into a higher or ſuperior one, by dividing the leſſer one with ſo many

many of its denomination as is contained in the greater. This is the converse of the left, and is termed reduction ascending. See the articles MULTIPLICATION and DIVISION.

The reduction of the principal monies, coins, weights, measures, &c. antient and modern, foreign and domestic, may be found under their respective articles MONEY, COIN, WEIGHT, MEASURE, POUND, FOOT, &c.

Thus pounds are reduced into shillings by multiplying with 20; shillings into pence, by multiplying with 12; and pence into farthings, by multiplying with 4. On the other hand, shillings are reduced into pounds, by dividing with 20; pence into shillings, by dividing with 12; and farthings into pence, by dividing with 4.

Examples. Let it be required to reduce 357 l. into shillings, and those shillings into pence; 357×20=7140= the shillings in 357 l. and 7140×12=85680= the pence in 357 l. as was required. Again, let it be required to reduce 85680 d. into shillings, and those shillings into pounds; 85680 ÷ by 12 = 7140= the shillings in 357 l. and 7140÷ by 20=357 l. as was required.

If there remain any thing in each division, it is respectively either odd pence, shillings, or farthings; thus 4123788 farthings, being reduced, give 4295 l. 12 s. 3 d.

But when the numbers proposed to be reduced are of several denominations, and it is required to bring them all to the lowest, you must reduce, as before, the highest or greatest denomination to the next less, adding the numbers that are of that next denomination together; then reduce their sum to the next lower denomination; adding together all the numbers that are of that denomination, and so proceed gradually on until all is done.

To expedite the practice of this rule, several compendious ways of reduction have been invented. See PRACTICE.

REDUCTION *of fractions*. See the article FRACTION.

REDUCTION *of equations*, in algebra. See the article EQUATION.

REDUCTION *of curves*. See CURVE.

REDUCTION *of a figure*, *design*, *or draught*, is the making a copy thereof, either larger or smaller than the original; still preserving the form and proportion. The great use of the proportional compasses is the reduction of figures, &c. whence they are called compasses of reduction. See the article COMPASS.

There are various methods of reducing figures, &c. the most easy is by means of the pentagraph, or parallelogram: but this has its defects. See the article PENTAGRAPH.

The best and most usual methods of reduction are as follows: 1. To reduce a figure, as A B C D E (plate CCXXX. fig. 1. n° 1.) into a less compass. About the middle of the figure, as *z*, pitch on a point, and from this point draw lines to its several angles A, B, C, &c. then drawing the line *ab* parallel to A B, *bc* parallel to B C, &c. you will have the figure *abcde* similar to A B C D E.

If the figure *abcde* had been required to be inlarged, there needed nothing but to produce the lines from the point beyond the angles, as *z*D, *z*C, &c. and to draw lines, *viz.* D C, C B, &c. parallel to the sides *dc*, *cb*, &c.

2. To reduce a figure by the angle of proportion, suppose the figure A B C D E (*ibid.* n° 2.) required to be diminished in the proportion of the line A B to *ab*, (*ibid.* n° 3.) draw the indefinite line G H (*ibid.* n° 4.) and from G to H set off the line A B. On G describe the arch HI. Set off the line *ab* as a chord on HI, and draw GI. Then with the angle I G H, you have all the measures of the figure to be drawn. Thus to lay down the point *c*, take the interval B C, and upon the point G, describe the arch KL. Also on the point G describe M N; and upon A, with the distance M N, describe an arch cutting the preceding one in *c*, which will determine the side *bc*. And after the same manner are the other sides and angles to be described. The same process will also serve to enlarge the figure.

3. To reduce a figure by a scale. Measure all the sides of the figure, as ABCDE, (*ibid.* n° 2.) by a scale, and lay down the same measures respectively from a smaller scale in the proportion required.

4. To reduce a map, design, or figure by squares. Divide the original into little squares, and divide a fresh paper of the dimensions required into the same number of squares, which are to be larger or less than the former, as the map is to be enlarged or diminished. This done in every square of the second figure, draw what you find in its correspondent one in the first.

**Reduction** *to the ecliptic*, in astronomy. The place of any star reduced to the ecliptic, is that point where the secondary passing through the star intersects the ecliptic. See the articles Reduction and Secondary.

**Reduction**, in metallurgy, is the bringing back metalline substances which have been changed into scoriæ or ashes, or otherwise divested of their metallic form, into their natural and original state of metals again. All metals and semimetals may be reduced by proper management, whatever have been their changes, except only zink, which having been burnt to ashes, admits of no reduction; but the mixture of gold and silver was never yet radically dissolved by any experiment, whatever some may have imagined. Even some earths will turn into metals by the admixture and intimate union of a phlogiston or inflammable principle.

**Reduction** *into first matter*, is a term which alchemists use when they find their substances putrify and grow black.

Reduction is more particularly used for the converting of a dry matter into a liquid, particularly into water, which by the alchemists is held the principle of all things.

**Reduction**, in surgery, denotes an operation whereby a dislocated, luxated, or fractured bone is restored to its former state or place. See the articles Luxation and Fracture.

**REDUIT**, in military affairs. See the article Reduct.

**REDUNDANCY**, or Redundance, a fault in discourse, consisting in the use of a superfluity of words. Words perfectly synonymous are redundant, and ought to be retrenched.

**REDUNDANT** hyperbola, is a curve of the higher kind, thus called because it exceeds the conic section of that name, in the number of its hyperbolical legs; being a triple hyperbola with six hyperbolical legs. See Hyperbola, Curve, and Conic Sections.

**REDUPLICATION**, in rhetoric, a figure whereby a verse begins with the same word as the preceding one ends with. See the article Anadiplosis.

**Reduplication**, in logic, a kind of condition expressed in a proposition indicating or assigning the manner wherein the predicate is attributed to the subject. Hence reduplicative propositions, are such wherein the subject is repeated with some circumstance or condition. Thus, *men, as men, are rational: kings, as kings, are subject to none but God.*

**REE**, Reis, or Res, a little portugueze copper coin. See the article Coin.

**REED**, an antient jewish measure. See the article Measure.

**Reed**, or the *Common* Reed, in botany, *arundo*. See the article Arundo.

**REEF**, a term in navigation. When there is a great gale of wind, they commonly roll up part of the sail below, that by this means it may become the narrower, and not draw so much wind; which contracting or taking up the sail they call a reef, or reefing the sail: so also when a top-mast is sprung, as they call it, that is, when it is cracked, or almost broken in the cap, they cut off the lower piece that was near broken off, and setting the other part, now much shorter, in the step again, they call it a reefed top-mast.

**REEL**, in the manufactories, a machine serving for the office of reeling. There are various kinds of reels, some very simple, others very complex. Of the former kinds those most in use are, 1. A little reel held in the hand, consisting of three pieces of wood, the biggest and longest whereof (which does not exceed a foot and a half in length, and ¼ of an inch in diameter) is traversed by two other pieces disposed different ways. 2. The common reel, or windlace, which turns upon a pivot, and has four flights traversed by long pins or sticks, whereon the skain to be reeled is put, and which are drawn closer or opened wider, according to the skain. A representation of the common reel may be seen in plate CCXXIX. fig. 5. where A is the bench or seat of the reel, B the two uprights, C the arms of the reel. Its arbor turning and hitching, its little lantern of four notches in the teeth of the wheel; D two wheels, the upper one of which moves the lower, by means of a pinion. E a hammer, the handle whereof is lowered by a peg at the bottom of the lower wheel. F a cord which is rolled round the axle of the lower wheel, and supports a weight which stops after a certain numbers of turns, to regulate the work-woman.

There are other reels used in particular arts, as the reel used in milling of silk, &c. and those in the reeling and winding of silks. See the article Silk.

**REELING**, in the manufactories, the wind-

winding of thread, silk, cotton, or the like, into a skain, or upon a bottom, to prevent its entangling. It is also used for the charging or discharging of bobbins or quills, to use them in the manufacture of different stuffs, as thread, silk, cotton, *&c.* Reeling is performed different ways, and on different engines. See the article REEL.

RE-ENTRY, in law, signifies the resuming or retaking that possession which any one had lately forgone; as where a person makes a lease of lands to another, the lessor thereby quits the possession, and if the lessee covenants that upon non-payment of the rent reserved, the lessor may lawfully re-enter, being as much as if it was conditioned for the lessor to take the land again into his hands, and recover the possession again by his own act without the assistance of the law. Likewise, if a lease for years be made, with condition that if the lessee assign his terms, the lessor may re-enter, and the lessee in breach of the condition assigns unknown to the lessor, who accepts of rent from the assignee without notice of the assignment, in that case it is held the lessor may re-enter, notwithstanding his acceptance of the rent.

REEVE *of a church*, the guardian of it, or the churchwarden. See CHURCH.

REEVING, in the sea language, the putting a rope through a block: hence to pull a rope out of a block, is called unreeving.

RE-EXCHANGE, in commerce, a second payment of the price of exchange, or rather the price of a new exchange due upon a bill of exchange that comes to be protested and to be refunded the bearer by the drawer or indorser. See the articles EXCHANGE and BILL.

RE-EXTENT, in law, a second extent upon lands or tenements, complaint being made that the former was partially executed. See the article EXTENT.

REFECTION, among ecclesiastics, a spare meal or repast just sufficing for the support of life: hence the hall in convents, and other communities, where the monks, nuns, *&c.* take their refections or meals in common, is called the refectory.

REFERENCE, in writing, *&c.* a mark relative to another similar one in the margin, or at the bottom of the page, where something omitted in the text is added, and which is to be inserted either in reading or copying. References are also used in books where things being but imperfectly handled, the reader is directed to some other part or place for a further explanation of them. For the use of these references in a work of this kind, we refer the reader to what has been said upon that subject in our introduction to this work.

REFINING, in general, is the art of purifying a thing; including not only the assaying or refining of metals, but likewise the clarification of liquors. See ASSAYING and CLARIFICATION.

REFINING *of gold* is performed three ways, *viz.* either with antimony, sublimate, or aqua fortis; the last of which is the most usual, and is called depart, or quartation. To refine gold with antimony, they make use of a wind-furnace, and a common crucible of a size answerable to the quantity of gold to be refined; always taking care that the gold and antimony, both together, do not fill the crucible more than half full. After the gold is melted in the crucible, the antimony is thrown in in powder: the proportion of the antimony to the gold is eight ounces to a pound, if the gold be between sixteen and twenty-two carats fine; if it be under sixteen carats, then they use five quarters of a pound to eight ounces of gold; and still the greater quantity of antimony is required, the coarser the gold is.

As soon as they have put the antimony into the crucible, they cover it, and after they have charged the furnace with charcoal, they put on the capital, which is let to stand till such time as the crucible is left quite bare; then they take off the capital, and leave the crucible to cool in the furnace of itself, till such time as they can take it out by the hand; then they break it, to get out the button or culot, which is a mass of fine gold remaining at the bottom, with the fæces of the antimony, the silver and copper alloy, and sometimes little particles of gold itself over it.

But notwithstanding the gold thus prepared is very pure, yet the antimony gives it such a harsh brittle quality, that it ceases to be ductile, and must be softened by the fire with salt-petre and borax, to bring it to itself. In order to this operation, they prepare what is called a dry coppel, which is a coppel made of crucible earth, that does not imbibe like the coppels made of ashes. When the coppel has been sufficiently heated in the refining furnace, they put the gold into it, and cover it over with charcoal.

As ſoon as the gold is diſſolved, which is very ſoon, by reaſon of the remains of the antimony, they blow it with the bellows to drive the mineral entirely away, which now goes off in ſmoak; and add to it, as ſoon as the fumes ceaſe, a little ſalt-petre and borax in powder, which collect the impurities that remained upon the diſſolution, and fix the gold in the coppel in the form of a plate. Then the gold is taken out of the coppel, and melted again in a crucible, with an addition of two ounces of ſalt-petre and borax in powder, to each eight ounces of gold, as ſoon as it has ceaſed to fume; and then it is caſt into an ingot, which upon trial is found to be twenty-three carats, twenty-ſix thirty ſeconds fine.

The particles of gold, detained with the alloy in the fæces of the antimony, are got out by a dry coppel, with the ſame meltings and ingredients, as were uſed in ſoftening the former: and when they are certain, by the aſſay, how much gold the matter contains, they refine it to ſeparate the copper, and afterwards make the depart or quartation. See the article QUARTATION.

As for the gold which may be left ſticking to the dry coppels, it is got by breaking and pulverizing the crucibles, and by repeated waſhings of the powder of them.

The method of refining gold, by means of ſublimate, is this: they begin the proceſs like that with antimony; that is, in the ſame furnace, with the ſame coal, the ſame fire, and the ſame crucibles. When the gold is melted in the crucible, they caſt in the ſublimate, not in powder, but only broken into pieces: the proportion is, if the gold be of twenty-two carats, an ounce or an ounce and a half, or even two ounces of the ſublimate to eight ounces of the gold; if of twenty carats, three ounces; and if it be only from eighteen to twelve, five or ſix ounces of the ſublimate to eight of the gold, in which laſt caſe they part the ſublimate into two, and put in one half at a time with the gold into a new crucible; which, when the operation is over, leaves the gold of eighteen or twenty carats, according as it was in fineneſs before. This done, they put the broken ſublimate into a crucible with the melted gold, covering it immediately to ſmother the mineral; and then fill the furnace with charcoal, having firſt put on the capital; after a quarter of an hour they take off the capital, lay the crucible bare, and blow off all the aſhes and other impurities, that may be floating on the liquid gold, with a pair of bellows. This is repeated again and again, till the impurities of the gold are carried off by the ſublimate, appearing of a bright glittering colour; after which being taken out of the crucible, it is caſt into an ingot.

This method of refining by ſublimate, is both cheaper and more complete than that by antimony; but they are both exceeding dangerous, by reaſon of the ſulphureous and arſenical exhalations; on which account the method by quartation is moſt practiſed.

REFINING *of ſilver* is performed two ways; one with lead, and the other with ſalt-petre.

In order to refine ſilver with lead, a coppel is filled with a mixture of brick-aſhes and aſhes of bullock's and other bones. It is ſet on the fire, and heated red hot; in which ſtate the ſilver and lead are put in together, in the proportion of a pound of lead to eight ounces of ſilver, and even ſomewhat more lead, if the ſilver be very coarſe.

As theſe two metals melt together, the copper before mixt with the ſilver diſſipates into ſmoak, or goes away with the ſcum; and ſo does the lead itſelf, leaving the ſilver alone in the coppel in its proper degree of fineneſs.

In this method of refining, wherein ſix or ſeven thouſand pounds may be refined at once, the metal is drawn out of the coppel two ways; the one by plunging in it, while ſtill liquid, a thick bar of iron, round which the ſilver ſticks in form of a ſhell or cruſt, repeating this again and again; the other is by letting the coppel ſtand till it is cold; in the bottom of which, the ſilver fixes in form of a cake.

This method of refining ſilver with lead, is both the beſt and the cheapeſt: however, for want of workmen who underſtand it, that with ſalt-petre ſtill obtains in many places; which is performed in a wind furnace. They firſt reduce the ſilver to be refined into grains, about the ſize of a ſmall pea; which is done by firſt melting it, then throwing it into a tub of common water, and then heating it over again in a boiler. This being done, they put it into a crucible; putting to every eight ounces of ſilver two of ſalt-petre. Then they cover the crucible with an earthen lid (in the form of a dome) exactly luted; which lid, how-

ever, muſt have a little aperture in the middle. The crucible being ſet into the furnace, and covered with charcoal, which is only to be lighted by degrees, at length they give it the full force of the fire, to put the metal into a perfect fuſion. This is repeated three times ſucceſſively, at an interval of a quarter of an hour. After the third fire they uncover the furnace, and let the crucible cool; and at length break it, to get out the ſilver, which is found in a button or culot, the bottom of which is very fine ſilver; and the top mixed with the fæces of the ſalt-petre, and the alloy of the ſilver, and even ſome particles of fine ſilver. Then they ſeparate the culot from the impurities, and melt it in a new crucible; and throw charcoal-duſt into the diſſolution, and work the whole briſkly together. Then they cover the crucible up again, charge the furnace with coal, and give it a ſecond fire.

Having done this, they blow off the aſhes and impurities with bellows, from off the top of the metal, till it appears as clear as a looking-glaſs; and then they throw in an ounce of borax broken to pieces. Then, in the laſt place, they cover the crucible up again, and give it the laſt fire, and after this caſt it into ingots, which are found eleven pennyweight and ſixteen grains fine. To recover the ſilver that may be left in the fæces and ſcoria, they pound them, and give them repeated lotions in freſh water.

REFINING of ſugar, ſulphur, camphor, nitre, &c. See SUGAR, CAMPHOR, &c.

REFLECTING, or REFLECTIVE DIAL. See the article DIAL.

REFLECTION, or REFLEXION, in mechanics, the return or regreſſive motion of a moving body, occaſioned by ſome obſtacle which hindered it from purſuing its former direction.

For the laws of the reflection of moving bodies, ſee MOTION, COMMUNICATION *of motion*, and PERCUSSION.

REFLECTION *of the rays of light*, in catoptrics, is their return, after approaching ſo near the ſurfaces of bodies, as to be thereby repelled, or driven backwards. Thus the ray AB (plate CCXXX. fig. 2. n° 1.) proceeding from the radiant A, and ſtriking on the point B of the ſpeculum or plane DE, being returned thence to C; BC repreſents the reflected ray, and B the point of reflection; in reſpect whereof AB repreſents the incident ray, or ray of incidence, and B the point of incidence. See MIRROUR.

Again, a line, as CG, drawn from any point, as C, of the reflected ray BC, perpendicular to the ſpeculum, is called the cathetus of the reflection, or cathetus of the eye; as a line, AF, drawn from the radiant perpendicular to the ſpeculum, is called the cathetus of incidence.

Of the two angles which the reflected ray BC makes with the mirrour, the ſmalleſt, CBE, is called the angle of reflection; as, of the two angles the incident ray makes with the ſpeculum, the ſmalleſt, ABD, is called the angle of incidence.

If the mirrour be either concave or convex, the ſmalleſt angles the ray makes with a tangent to the point of reflection and incidence, are the angles of reflection and incidence.

The angle CBH, which the reflected ray makes with a perpendicular to the point of reflection, is called the inclination of the reflected ray; as the angle ABH is called the inclination of the incident ray.

The great law of reflection is, that the angle of reflection, CBE, is always equal to the angle of incidence, ABD, as has been demonſtrated under the article INCIDENCE.

The rays of light are found by experiment to be differently reflexible, in the ſame manner, and for the ſame reaſon, that they are differently refrangible; or that thoſe rays which were leaſt and moſt refrangible, were alſo leaſt and moſt reflexible; and, conſequently, exhibit the ſame colours, and in the ſame order. See the article COLOUR.

*Cauſes of the* REFLECTION *of light*. The opinions of philoſophers, relating to the cauſe of this difficult phænomenon, being principally four, are thus ſtated by Mr. Rowning. 1. It was the opinion of philoſophers, before Sir Iſaac Newton diſcovered the contrary, that light is reflected by impinging upon the ſolid parts of bodies. But that this is not the caſe, will appear from the following reaſons: and, firſt, it is not reflected at the firſt ſurface of the body, by impinging againſt; for it is evident, that in order to the due and regular reflection of light, that is, that the reflected rays ſhould not be diſperſed and ſcattered one from another, there ought to be no raſures or unevenneſs in the reflecting ſurface large enough to bear a ſenſible proportion to the magnitude of a ray of light; becauſe, if the

 ſurface

ſurface abounds with ſuch, the reflected rays will rather be ſcattered like a parcel of pebbles thrown upon a rough pavement, than reflected with that regularity with which light is obſerved to form a well poliſhed one, which are far from being ſo; for to poliſh is no other than to grind off the larger eminences and protuberances of the metal with the rough and ſharp particles of ſand, emery, or putty, which muſt of neceſſity leave behind them an infinity of raſures and ſcratches, which, though inconſiderable with regard to the former roughneſſes, and too minute to be diſcerned by us, muſt, nevertheleſs, bear a large proportion to, if not vaſtly exceed, the magnitude of the particles of light.

Secondly, that it is not reflected by impinging upon the ſolid particles which conſtitute this ſecond ſurface, is ſufficiently clear from the foregoing argument; the ſecond ſurfaces of bodies being as incapable of a perfect poliſh as the firſt; and it is farther confirmed from hence, *viz.* that the quantity of light reflected, differs according to the different denſity of the medium behind the body: and that it is not reflected by impinging upon the particles which conſtitute the ſurface of the medium behind it, is evident, becauſe the ſtrongeſt reflection of all at the ſecond ſurface of the body, is when there is a vacuum behind it.

2. It has been thought by ſome, that it is reflected at the firſt ſurface of a body, by a repulſive force equally diffuſed over it, and at the ſecond by an attractive force.

If there be a repulſive force diffuſed over the ſurface of bodies, that repels rays of light at all times, then, ſince by increaſing the obliquity of a ray, we diminiſh its perpendicular force (which is that only whereby it muſt make its way thro' this repulſive force) however weakly that force may be ſuppoſed to act, rays of light may be made to fall with ſo great a degree of obliquity on the reflecting ſurface, that there ſhall be a total reflection of them there, and not one particle of light be able to make its way through, which is contrary to obſervation; the reflection of light at the firſt ſurface of a tranſparent body being never total in any obliquity whatever. The hypotheſis, therefore, in this particular, muſt be falſe.

As to the reflection at the ſecond ſurface by the attractive force of the body, this may be conſidered in two reſpects, *viz.* when the reflection is total, and when it is partial.

And firſt, in caſes where the reflection is total, the cauſe of it, undoubtedly, is that ſame attractive force by which light would be refracted in paſſing out of the ſame body: this is manifeſt from that analogy which is obſervable between the reflection of light at this ſecond ſurface and its refraction there. For, otherwiſe, what can be the reaſon that the total reflection ſhould begin juſt when the obliquity of the incident ray, at its arrival at a ſecond ſurface, is ſuch, that the refracted angle ought to be a right one; or when the ray, were it not to return in reflection, ought to paſs on parallel to the ſurface, without going from it? For, in this caſe, it is evident, that it ought to be returned by this very power, and in ſuch manner, that the angle of reflection ſhall be equal to the angle of incidence: juſt as a ſtone thrown obliquely from the earth, after it is ſo far turned out of its courſe by the attraction of the earth, as to begin to move horizontally, or parallel to the ſurface of the earth, is then, by the ſame power, made to return in a curve ſimilar to that which is deſcribed in its departure from the earth, and ſo falls with the ſame degree of obliquity that it was thrown with.

But, ſecondly, as to the reflection at the ſecond ſurface, when it is partial; an attractive force uniformly ſpread over it, as the maintainers of this hypotheſis conceive it to be, can never be the cauſe thereof, becauſe it is inconceivable, that the ſame force, acting in the ſame circumſtances in every reſpect, can ſometimes reflect the violet-coloured rays and tranſmit the red, and at other times reflect the red and tranſmit the violet.

This argument concludes equally againſt a repulſive force uniformly diffuſed over the firſt ſurface of a body, and reflecting light there; becauſe ſome bodies reflect the violet and tranſmit the red, others reflect the red and tranſmit the violet at their firſt ſurface; which cannot poſſibly be upon this ſuppoſition, the rays of whichever of theſe colours we ſuppoſe to be the ſtrongeſt.

3. Some being apprehenſive of the inſufficiency of a repulſive and attractive force diffuſed over the ſurface of bodies, and acting uniformly, have ſuppoſed, that by the action of light upon the ſurfaces

faces of bodies, the matter of these forces is put into an undulatory motion, and that where the surface of it is subsiding, light is transmitted, and in those places where it is rising, light is reflected. But this seems to advance us not one jot farther; for in those cases, suppose where red is reflected and violet transmitted, how comes it to pass that the red impinges only on those parts when the waves are rising, and the violet when they are subsiding?

4. The last hypothesis is that of Sir Isaac Newton; who is of opinion, that light, in its passage from the luminous body, is disposed to be alternately reflected by, and transmitted through, any refracting surface it may meet; and this disposition he calls fits of easy reflection, and easy transmission. Thus, if we take the distances as the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, *&c.* then at the distances 0, 2, 4, 6, 8, *&c.* the light will be transmitted; and, at the distances 1, 3, 5, 7, 9, *&c.* it will be reflected in coloured rings.

These fits he thinks probably owing to some subtile and elastic substance, diffused through the universe, in the following manner: as bodies falling into water or passing through the air, cause undulations in each, so the rays of light may excite vibrations in this elastic substance: the quickness of which vibrations depending on the elasticity of the medium, the motion of the particles of it may be quicker than that of the rays; and therefore, when a ray, at the instant it impinges upon any surface, is in that part of a vibration of this elastic substance which conspires with its motion, it may be easily transmitted; and when it is in that part of a vibration which is contrary to its motion, it may be reflected. Also, when light falls on the first surface of a body, none is reflected there; but all that happens to it there is, that every ray that is not in a fit of easy transmission is there put into one, so that, when they come to the other side, the rays of one colour shall be in a fit of easy transmission, and those of another in a fit of easy reflection, according to the thickness of the body, the intervals of the fits being different in rays of a different kind. This doctrine of the easy reflection and easy transmission of the rays of light, ought by no means to be looked on as a mere hypothesis, since Sir Isaac has evinced, by experiments, that this is the case. The first experiment he mentions is the compression of two prisms hard together, whose sides were a little convex, by which means they touched by a small part of their surfaces, and contained every where else a thin plate of air, as it may be properly called, whose thickness did every where gradually increase from the touching parts. He observed the place where they touched became absolutely transparent, as if they had there been one continued piece of glass. For when the light fell so obliquely on the plate of air between the prisms as to be all reflected, it seemed in that place of contact to be wholly transmitted, insomuch that when looked upon, it appeared like a black or dark spot, by reason that little or no sensible light was reflected from thence, as from other places. When he looked through the prisms, this place of contact seemed, as it were, a hole in the plate of air; and through this hole objects that were beyond might be seen distinctly, which could not be seen through other parts of the glasses where the air was interjacent. By harder compression the spot was dilated by the yielding inwards of the parts of the glasses.

When the plate of air, by turning the prisms about their common axis, became so little inclined to the incident rays that some of them began to be transmitted, there arose in it many slender coloured arches, which at first were shaped almost like the conchoid, as in *ibid.* n° 2. and by continuing the motion of the prisms, these arches increased and bended more and more about the said transparent spot, till they were completed into circles or rings encompassing it; and afterwards continually grew more and more contracted. These arches and rings became tinged with various colours, as the motion of the prisms was continued, being at first of a violet and blue; afterwards of a white, blue, violet; black, red, orange, yellow, white, blue, violet, *&c.* after this the coloured rings contracted, and became only black and white. The prisms being farther moved about, the colours all began to emerge out of the whiteness, and in a contrary order to what they had before.

But to observe more nicely the order of the colours which arose out of the white circles, as the rays became less and less inclined to the plate of air, Sir Isaac Newton made use of the two object-

glasses,

glaſſes, one a plano-convex, and the other a double-convex, of the ſame ſphericity on both ſides, of fifty-one feet focal diſtance; and upon this he laid the plane ſide of the other, preſſing them ſlowly together to make the colours ſucceſſively emerge in the middle of the circles, and then ſlowly lifted the upper glaſs from the lower to make them ſucceſſively vaniſh again in the ſame place.

Upon compreſſion of the glaſſes, various colours would emerge and ſpread into concentric circles or rings of different breadths and tints encompaſſing the central ſpot. Their form, when the glaſſes were moſt compreſſed, is delineated, *ibid.* n° 3. where *a* is the central black ſpot, and the circuits of colours from thence outwards as follows:

1 { *b*, blue. *c*, white. *d*, yellow. *e*, red.
2 { *f*, violet. *g*, blue. *h*, green. *i*, yellow. *k*, red.
3 { *l*, purple. *m*, blue. *n*, green. *o*, yellow. *p*, red.
4 { *q*, green. *r*, red.
5 { *s*, greeniſh blue. *t*, red.
6 { *u*, greeniſh blue. *x*, pale red.
7 { *y*, greeniſh blue. *z*, reddiſh white.

Theſe rings were obſerved to be leaſt when the eye was held perpendicularly over the glaſſes in the axis of the rings: whereas, viewed obliquely, they became bigger, continually ſwelling as the eye was removed farther from the axis: and the coloured rings made in air, became much more diſtinct and viſible, when viewed in a dark room by the reflection of the coloured light of the priſm. The rings made by reflection of red light were manifeſtly bigger than thoſe made by the blue and violet; and it was very pleaſant to ſee them gradually ſwell and contract according as the colour of the light was changed. The motion was quickeſt in the red, and ſloweſt in the violet; and, by an eſtimation made of the diameters of the rings, the thickneſſes of air in the places where the rings are made by the limits of the ſeven colours, red, orange, yellow, green, blue, indigo, violet, ſucceſſively in order, were to one another as the cube roots of the ſquares of the eight lengths of a chord which ſound the notes of an octave, that is, of the numbers $1, \frac{8}{9}, \frac{5}{6}, \frac{3}{4}, \frac{2}{3}, \frac{3}{5}, \frac{9}{16}, \frac{1}{2}$.

Theſe rings were not of various colours, as thoſe made in the open air, but appeared all over of that priſmatic colour only with which it was illumined; and by throwing the coloured light directly on the glaſſes, that which fell on the dark ſpaces between the rings was tranſmitted through the glaſſes without any variation of the colour. This appeared by placing a white paper behind, on which the rings were painted of the ſame colour as thoſe by reflected light, and of the bigneſs of their immediate ſpaces. Hence the origin of theſe rings is manifeſt; namely, that the air between the glaſſes, according to its various thickneſs, is diſpoſed in ſome places to reflect, in others to tranſmit the light of any one colour; and in the ſame place to reflect that of one colour, where it tranſmits that of another; in the manner as you ſee repreſented *ibid.* n° 4. where A B, C D, are the glaſſes, as before; and *a, c, e, g, i, l, n, p,* the parts of the beam tranſmitted; and *b, d, f, h, k, m, o,* the parts of the beam reflected, making the coloured rings.

REFLECTION *of the moon*, the ſame with her variation. See VARIATION.

REFLECTION is alſo uſed, figuratively, for an operation of the mind; whereby it turns its view backwards as it were upon itſelf, and makes itſelf and its own operation the object of its diſquiſition; and by contemplating the manner, order, and laws which it obſerves in perceiving ideas, comparing them together, reaſoning, &c. it frames new ideas of the relations diſcovered therein. See the articles IDEA, KNOWLEDGE, REASONING, &c.

REFLEX, or REFLECT, in painting, is underſtood of thoſe places in a picture which are ſuppoſed to be illuminated by a light reflected from ſome other body, repreſented in the ſame piece.

REFLEX VISION, that performed by means of reflected rays, as from mirrours. See the articles VISION, REFLECTION, and MIRROUR.

REFLUX *of the ſea*, the ebbing of the water, or its returning from the ſhore. See the article TIDES.

REFORM, a re-eſtabliſhment, or revival of formerly neglected diſcipline, or a correction of the reigning abuſes therein.

*To* REFORM, in a military ſenſe, is to reduce a company, regiment, &c. either by diſbanding the whole, or breaking a part, and retaining the reſt.

REFORMADO, or REFORMED OFFICER, one whoſe troop or company is ſuppreſſed in a reform, and he continued either

either in the whole or half-pay, doing duty in the regiment.

REFORMATION, the act of reforming, or correcting an error or abufe in religion, difcipline, or the like.

The reformation, fo called by way of eminence, is the feparation of the proteftants from the church of Rome, in the beginning and towards the middle of the fixteenth century. See the article LUTHERANS, &c.

REFRACTED, or REFRACTIVE DIAL, one that fhews the hour by means of fome refractive tranfparent fluid. See the article DIAL.

REFRACTION, in general, is the deviation of a moving body from its direct courfe, occafioned by the different denfity of the medium it moves in; or, it is a change of direction, occafioned by a body's falling obliquely out of one medium into another of a different denfity.

The great law of refraction, which holds in all bodies, and all mediums, is, that a body, paffing obliquely out of one medium into onother wherein it meets with lefs refiftance, is refracted or turned towards the perpendicular; and, on the contrary, in paffing out of one medium into another wherein the refiftance is greater, it is refracted or turned from the perpendicular. Hence the rays of light, falling out of air into water, are refracted towards the perpendicular; whereas a ball, thrown into the water, is refracted from it. Now the reafon of this difference is, that water, which refifts the motion of light lefs than air, refifts that of the ball more; or, to fpeak more juftly, becaufe water, by its greater attraction, accelerates the motion of the rays of light more than air does.

In order to illuftrate the refraction of light, let AB (plate CCXXI. fig. 1. n° 1.) reprefent a ray moving in air from A to B, and paffing into water at B; and let H K be perpendicular to the furface of the water at the point B. When therefore the ray enters the water, it does not continue its motion ftraight forward in the line B C, but in fome other line, as B D, which is nearer or more inclined to the perpendicular B K: and, on the other hand, if the line D B be fuppofed to be a ray of light moving in water from D to B, and there paffing into air, inftead of continuing its motion ftraight forward in the direction B E, it goes on in fome other direction as B A; which being lefs inclined to, is more diftant from, the perpendicular B H, as will appear from the following experiment. Let an empty veffel, as B C D E (*ibid.* n° 2.) have a fmall object placed at its bottom at A; and let it be fo fituated as that the fight of the object may be intercepted by the fide of the veffel, from an eye placed at Q; then let the veffel be filled with water, and the ray A B, which, before the water was poured in, moved in a right line from A to K, and by fo doing paffed above the eye, will, upon its emerfion out of the water, be bent downward, fo as to ftrike upon the eye at Q, and thereby render the object at A vifible. This bending of the rays of light, in their paffage out of one medium into another, is owing to the attractive force of the denfer medium acting upon the rays at right angles to the furface.

The fundamental law of the refraction of the rays of light is, that the fine of the angle of incidence is always in a conftant ratio to the fine of the angle of refraction, in all inclinations of the incident ray whatever. See INCIDENCE.

Now that this is the cafe, whatever be the inclination of the incident ray, may be proved experimentally in the following manner: let a brafs quadrant, C F E, (*ibid.* n° 3.) graduated on both fides, and fixed at its center C, to a perpendicular pillar, C D, have two indices, A and B, one on each fide, moveable on the center C; and let the index A, whereof the ftem G is a continuation, be made to point to the fifteenth degree, and the index B to the fifteenth minute of the twentieth degree: let then the pillar be immerfed in water, till C E, the horizontal edge of the quadrant, touch the furface of the water; and upon viewing the ftem G, immerfed in the water, it will, by reafon of the refraction, appear to have changed its fituation, and to lie in a line with the index B. And the fame thing will likewife obtain, if the index A be fet at the thirtieth degree, and B at the thirtieth minute of the forty-fecond degree; that is, twenty-five, the fine of the leffer angle of incidence, is to thirty-three, the fine of the correfponding angle of refraction; as fifty, the fine of the greater angle of incidence, is to fixty-fix, the fine of the angle of refraction correfponding thereto. And the fame holds of

of all other angles of incidence and refraction.

Since then the ratio of thefe fines is conftant, it remains that we determine what that ratio is in different mediums; in order to which we fhall firft premife the following lemma. Let G H D, *(ibid.* n° 4.) be an equilateral triangle, and let the angle D be biffected by the right line D O; let A K, M C, be drawn parallel to the fide G H, and through the point K draw I K N cutting O D in N: then is the angle A K I = N K B. Alfo the triangle is divided into two fimilar and equiangular triangles, NKB and BKD, by the perpendicular K B; and, therefore, the angle N K B is equal to the angle K D B: all which is evident from Euclid's Elements.

Suppofe now that G H D be the fection of a prifm of water or glafs, or any pellucid medium; and K M a ray of light paffing through it, parallel to the fide G H; and let it go out of the prifm, and be refracted into the air, on each fide, into the directions K F, M E: and, laftly, upon the point K, defcribe the femi-circle P I Q: then is N K B (= K D B) = F K I, the angle of incidence out of the prifm into air, and A K I is the angle of refraction; confequently A R, and F S, are the fines of the angles of incidence and refraction, out of the prifm into air. On the contrary, we may confider F K as the incident ray falling upon the prifm in the point K, and refracted in the direction K M, parallel to the fide G H, which at the point M emerges again into the air in the direction ME, making the angle E M L, with the perpendicular M L, equal to the angle F K I. In this cafe the angle F K I is the angle of incidence, and N K B is the angle of refraction in the prifm; which angle of refraction is therefore given, or conftant, as it is always equal to the angle K D B, or half the angle of the prifm.

The angle of incidence, F K I, confifts of two parts, *viz.* of the given angle A K I (= K D B) and the additional angle A K F. Now the angle A K I is known, as being equal to half the angle of the prifm; and the angle F K A is known by placing the prifm by the center of a graduated femi-circle, as A B C, (*ibid.* fig. 5.) carrying an index, whofe two arms, F K and K E, are equally elevated above the horizontal line A C, and correfpond to the incident and emergent ray F K and ME in the other figure. For here it is evident, if an object be placed on the end of the arm F, it will be feen by an eye looking through the fights at the other end of the index E; and when the object is thus feen, the angle A K F is known by the number of degrees which each arm cuts upon the limb of the femi-circle.

This number of degrees, added to the conftant number thirty degrees, which is equal to half the angle of the prifm, gives the whole angle of incidence FKI; and thus the angle of incidence and refraction being found, the proportion of the fines F S and A R will be difcovered, which ratio is always the fame while the matter of the prifm remains the fame, as was before fhewn from the theory, and may by this inftrument be proved by experiment. For example, let the prifm be of water, it will be neceffary to elevate each arm twelve degrees upon the limb, before the image of the object at F can be feen by the eye at E; then 12 + 30 = 42° = F K A + A K I = F K I, the angle of incidence. But the fine F S of 42°, is to the fine A R of 30°, as 4 to 3 very nearly.

Now it is plain, if the ratio of the fines A R and F S were not fixed, fince F S might be in any ratio greater or lefs than A R, the incident ray F K may make an angle F K I greater or lefs than forty-two degrees, and yet the object at F be feen by the eye at E: but this we find by experiment to be impoffible, becaufe there is no elevation of the arms of the index that will exhibit the appearance of the object but the one above-mentioned.

If G H D were a prifm of glafs, as that is a denfer body than water, fo its refractive power will be greater; and, confequently, it will act more ftrongly on the ray K M, at its exit into the air, and caufe it to be refracted farther from the perpendicular I K or M L. Therefore the angle of incidence out of air into glafs, *viz.* F K I, ought to be greater, and fo to require a greater elevation of the legs of the index than before in the prifm of water: and this we find, by experiment, is the cafe; for then the elevation, inftead of twelve degrees, muft be about twenty-two or twenty-three degrees.

Hence it is plain, the fine of incidence, F S, muft be in a conftant ratio to the fine of refraction, AR; becaufe fince the angle A K L is invariable, being always equal to

to G D O; and in the fame medium, G D H, the angle F K I muft always be the fame, becaufe the refractive power is every where fo: therefore, the angles being conftant, the fines will be fo too, or their ratio to each other always the fame. And as by this inftrument the angles of incidence and refraction, are difcovered, the ratio of their fines will be known of courfe, for each refpective medium: thus, in water the fine of forty-two degrees, is to the fine of thirty degrees, nearly as four to three; in glafs, the fine of forty-fix degrees is to the fine of thirty degrees, as three to two; or, more nearly as feventeen to eleven: and, to mention no more, it has been found, by fome experiments, that the fine of incidence is to the fine of refraction in diamond, as five to two. But, fince in phyfical matters no authority is comparable to that of Sir Ifaac Newton, we fhall give a table from his optics, fhewing the proportion of the fines of incidence and refraction of yellow light, that being nearly a mean between the greateft and leaft refrangible rays; this is contained in the firft column; the fecond column expreffes the denfities of the bodies eftimated by their fpecific gravities; and the third fhew the refractive power of each body, in refpect of its denfity.

| The refract-ing body. | Proportion of the fines. | The denfity | Ref. power |
|---|---|---|---|
| Air - - | 3201 to 3200 | 0,0012 | 5208 |
| Glafs of ant. | 17 to 9 | 5,2800 | 4864 |
| Pfeudo-topaz | 23 to 14 | 4,2700 | 3979 |
| A felenites | 61 to 41 | 2,2520 | 5386 |
| Com. glafs | 31 to 20 | 2,5800 | 5436 |
| Cryft. of rock | 25 to 16 | 2,6500 | 5450 |
| Ifland cryft. | 5 to 3 | 2,7200 | 6536 |
| Sal gemmæ | 17 to 11 | 2,1430 | 6477 |
| Alum - - | 35 to 24 | 1,7140 | 6570 |
| Borax - - | 22 to 25 | 1,7140 | 6716 |
| Nitre - - | 32 to 21 | 1,9000 | 7079 |
| Dantzick vit. | 303 to 200 | 1,7150 | 7551 |
| Oil of vitriol | 10 to 7 | 1,7000 | 6124 |
| Rain-water | 529 to 396 | 1,000 | 7854 |
| Gum-arabic | 31 to 21 | 1,3750 | 8574 |
| Spirit of wine rectified | 100 to 73 | 0,8660 | 10121 |
| Camphor | 3 to 2 | 0,9960 | 12551 |
| Oil-olive | 22 to 15 | 0,9130 | 12607 |
| Linfeed-oil | 40 to 27 | 0,9320 | 12819 |
| Sp. of turp. | 25 to 17 | 0,8740 | 13222 |
| Amber - - | 14 to 9 | 1,4400 | 13654 |
| A diamond | 100 to 41 | 3,4000 | 14556 |

The refraction of the air in this table is determined by that of the atmofphere, as obferved by aftronomers; for if light pafs through many refracting fubftances, or mediums, gradually denfer and denfer, and terminated with parallel furfaces, the fum of all the refractions will be equal to the fingle refraction it would have fuffered in paffing immediately out of the firft medium into the laft.

As to the different refrangibility of the feveral forts of rays of light, it has already been explained under the articles COLOUR and RAINBOW.

REFRACTION, in aftronomy. From what has been faid, the refraction of the rays of light, iffuing from a heavenly body, in paffing through the atmofphere of our earth, will be eafily underftood. Thus, the ray A B (*ibid.* n° 6.) proceeds from the ftar A in a right line, till it reach the atmofphere of the earth at B; upon entering which, it it will be refracted towards the perpendicular B C, fuppofed to be drawn from B to C, the center of the earth; and as it paffes on through the atmofphere towards it, D, it will be continually refracted the fame way, by reafon it all along enters a denfer part of the atmofphere; and hence it will defcribe the curve B D bending downwards, fo as to render the object vifible to a fpectator at D. But, as all vifion is performed in right lines, the fpectator at D will fee the ftar in the tangent line D E; and, confequently, the apparent place of the ftar will be E; which is higher, or nearer the zenith than its true place A.

From hence, it is, that the fun, moon, and ftars appear above the horizon when juft below it; and higher than they ought to do when they are above it.

Farther, the refraction of the heavenly bodies is greateft in the horizon, and gradually decreafes as their altitudes increafe, till near the zenith it becomes fcarcely fenfible, and in the zenith none at all. In taking, therefore, the altitudes of the heavenly bodies, it is abfolutely neceffary to fubtract from, the obferved altitude their refractions, a table of which we have given under the article QUADRANT.

Refraction ferves alfo to account for the oval appearance of the fun and moon near the horizon: for the lower thefe objects are, the greater is the obliquity with which their rays enter the atmofphere, to pafs from the nearer to the denfer parts of it; and, therefore, they appear to be the

the more elevated by refraction; so that, when very near the horizon, the lower part of them is thereby more elevated than the upper part: and hence they appear of an oval figure, by reason their horizontal diameters are no ways altered, while their vertical or upright diameters are shortened by the different refractions of the upper and lower limbs. There is also another alteration made by refraction in the apparent distance of stars: thus, if two stars are in the same circle of altitude, their apparent distance is less than the true; but since refraction makes each of them higher than they really are, it must bring them into parts of the verticals, where they come nearer together.

REFRACTION *of altitude* is an arch of a vertical circle, whereby the altitude is increased by the refraction.

REFRACTION *of declination* is an arch of a circle of declination, whereby the declination of the object is either increased or diminished by the refraction.

REFRACTION *of longitude* is an arch of the ecliptic, whereby the longitude of the object is increased or diminished by the refraction.

REFRACTION *of latitude* is an arch of a circle of latitude, whereby the latitude of a heavenly object is either increased or diminished by its refraction.

REFRACTION *in island crystal.* There is a double refraction in this substance, contrary ways, whereby not only oblique rays are divided into two, and refracted into opposite parts, but even perpendicular rays, and one half of them refracted.

*Caustic by* REFRACTION. See the article DIACAUSTIC CURVE.

REFRANGIBILITY *of light*, the disposition of rays to be refracted. See REFRACTION, LIGHT, and RAY.

REFRIGERATIVE, in medicine, a remedy which refreshes the inward parts, by cooling them, as clysters, ptisans, &c.

REFRIGERATORY, in chemistry, a vessel filled with cold water, through which the worm passes in distillations; the use of which is, to condense the vapours as they pass through the worm.

REFUGE, a sanctuary or asylum. See article ASYLUM.

REFUGEES, french protestants, who by the revocation of the edict of Nantz, have been constrained to fly from persecution and take refuge in foreign countries.

REGAL, or ROYAL, something belonging to a king. See the article ROYAL.

REGALE, a magnificent entertainment or treat given to embassadors, and other persons of distinction, to entertain or do them honour.

It is usual, in Italy, at the arrival of a traveller of eminence, to send him a regale, that is, a present of sweetmeats, fruit, &c. by way of refreshment.

REGALE, in the french jurisprudence, is a royal prerogative, which consists in enjoying the revenues of bishoprics during the vacancy of their sees, of presenting to benefices, and of obliging the new bishop to take an oath of fidelity, and to register it in the chamber of accounts. The enjoyment of the fruits of the see is called the temporal regale; and that of presenting to the see, the spiritual regale.

REGALIA, in law, the rights and prerogatives of a king; which, according to civilians are six: *viz.* 1. the power of judicature: 2. the power of life and death: 3. the power of peace and war: 4. a right to such goods as have no owner, as waifs, estrays, &c. 5. assessments; and 6. the coinage of money.

Regalia is also used for the apparatus of a coronation, as the crown, the sceptre with the cross, that with the dove, St. Edward's staff, the globe, and the orb with the cross, four several swords, &c.

REGALIA *of the church* are the rights and privileges which cathedrals, &c. enjoy by the grants of kings; and this term is particularly used for such lands and hereditaments as have been given by kings to the church.

Regalia is also sometimes used for the patrimony of the church.

REGARD *of the forest*, the inspection or oversight thereof, or the office and province of the regarder. See REGARDER.

REGARDANT, in heraldry, signifies looking behind, and is used for a lion, or other beast, with his face turned towards his tail.

*Villain* REGARDANT, or REGARDANT *to the manor*, signifies a servant or retainer to the lord, who was thus called from his doing all the base services within the manor, and being charged to see that it was freed from every thing filthy and loathsome.

REGARDER, an antient officer of the king's forest, sworn to make the regard of the forest every year; that is, to take a view of its limits, to enquire into all offences and defaults committed by the foresters

foresters within the forest, and to observe whether all the other officers executed their respective duties.

REGEL, or RIGEL, a fixed star of the first magnitude, in orion's left foot, whose longitude is 72° 10′, and latitude 30° 10′. See the article ORION.

REGEN, a river of Germany, which rises in the mountains that divide Bohemia from Bavaria, and falls into the Danube at Ratisbon.

REGENERATION, in theology, the act of being born again by a spiritual birth, or the change of heart and life, experienced by a person who forsakes a course of vice, and sincerely embraces a life of virtue and piety.

REGENT, one who governs a kingdom during the minority or absence of the king.

In France, the queen-mother has the regency of the kingdom during the minority of the king, under the title of queen-regent.

REGENT also signifies a professor of arts and sciences in a college, who has a set of pupils under his care; but here regent is generally restrained to the lower classes, as regent of rhetoric, regent of logic, &c. those of philosophy are rather called professors. The foreign universities are generally composed of doctors, professors, and regents.

REGICIDE, KING-KILLER, a word chiefly used with us in speaking of the persons concerned in the trial, condemnation and execution of king Charles I.

REGIFUGE, a feast celebrated in antient Rome on the sixth of the calends of March, in memory of the expulsion of their antient kings, and particularly of Tarquin's flying out of Rome on that day.

REGIMEN, the regulation of diet, and in a more general sense, of all the non-naturals, with a view to preserve or restore health.

Dr. Mead observes, with respect to regimen, that diseases from inanition are generally more dangerous than those which proceed from repletion, because we can more expeditiously diminish than increase the juices of the body. Upon this account, though temperance is beneficial to all men, the antient physicians advised persons in good health to indulge a little now and then, by eating and drinking more plentifully than usual: but of the two, intemperance in drinking is safer than in eating; and if a person has committed excess in the latter, cold water drank upon a full stomach will help digestion; to which it will be of service to add lemon-juice or elixir of vitriol, if he has eaten high seasoned things, rich sauces, &c. Then let him sit up for some time, and afterwards sleep. But if a man happens to be obliged to fast, he ought to avoid all laborious work. From satiety it is not proper to pass directly to sharp hunger, nor from hunger to satiety; neither will it be safe to indulge absolute rest immediately after excessive labour, nor suddenly to fall to hard work after long idleness. In a word, all changes in the ways of living should be made by degrees. It is also beneficial to vary the scenes of life, to be sometimes in the country, sometimes in town; to go to sea, to hunt, to be at rest now and then, but more frequently to use exercise, and a moderate sleep. See the articles EXERCISE and SLEEP.

The softer and milder kinds of aliment are proper for children, and for youths the stronger. Old people ought to lessen the quantity of their food, and increase that of their drink. But yet some allowance is to be made for custom, especially in the colder climates, like ours; for as in these the appetite is keener, so the digestion is better performed.

In the summer, when the spirits and fluid parts are apt to evaporate, the aliment should be light, moist, fluid, and easy of digestion, to repair the loss with the greater speed: and as digestion depends in part on the due preparation of the aliments, it is necessary to chew them well, especially if they are hard, that they may be the more intimately mixed with the saliva; for those who eat in a hurry, without much chewing, are very subject to indigestions. For the qualities of different kinds of food, see DIET, DIGESTION, FLESH, FRUIT, &c.

It is well known, that cold stops the pores, and diminishes perspiration. To shun this inconvenience, it will be necessary to put on winter garments pretty early, and to leave them off late, and not to pass too suddenly from a hot into a cold air, and to avoid drinking any thing cold, when the body is hot, or when a person has been for some time speaking in public.

In short, the passions and affections of the mind produce very sensible effects. Joy, anger, fear, and sorrow, are the principal. In the first, the spirits are hurried with too great vivacity; in fear or dread, they

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are as it were, curbed and concentrated; and continual sorrow and anguish of mind render the fluids of the body thick, and the blood unapt for a due circulation, whence proceed many chronic diseases: it is therefore, on all accounts, as much our interest as our duty, to keep the passions within due bounds, and to preserve an inward serenity, calmness and tranquillity.

Regimen, in chemistry, signifies the due regulation of fire. See the article Fire.

Regimen, in grammar, that part of syntax, or construction, which regulates the dependency of words, and the alterations which one occasions in another.

Regimen is threefold, of nouns, of verbs, and of indeclinable words. See Noun, Verb, and Indeclinable.

The regimen of latin-substantive nouns is mostly of the genitive case; but that of adjectives, is of the genitive, dative, accusative and ablative.

The regimen of verbs may be distributed into three classes, the first of which is the regimen of verbs personal; the second is that of verbs impersonal; and the third that of the infinitives, participles, gerunds, and supines. See the articles Verb, Participle, *&c.*

The regimen of indeclinable words is that of the adverbs, prepositions, interjections and conjunctions. See the articles Adverb, Preposition, *&c.*

In general, the regimen, or constitution of government, is almost intirely arbitrary, and varies greatly in all languages. For one language forms its regimen by cases, as the latin and greek. Others, instead of cases, make use only of small particles, as the english by *of, to*, &c. The french, spanish, and italian by *de, a, da*, &c. There are, however, some few maxims which hold good in every language, as, 1. That there is no nominative case in any sentence but has a reference to some verb either expressed or understood. 2. That there is no verb which has not its nominative case expressed or understood, though in the latin before an infinitive, there is an accusative. 3. That there is no adjective but has a relation to some substantive. 4. That there is no genitive case but is governed by some other noun. The rule does not so apparently hold in the modern, as in the antient languages, in regard, the particles *of, de*, &c. which are the proper signs of the genitive case, are frequently used as prepositions. 5. That the regimen of verbs is frequently laid upon different kinds of relations, according to custom or usage, which yet does not change the specific relation of each case, but only shews that custom has made choice of this or that according to fancy.

Sometimes these different governments have a power of changing the sense according to the different custom of languages, in which case the particular use of languages must be always consulted.

There is one very common fault committed in regimen, which should be carefully avoided by accurate writers, *viz.* the using two verbs that require different cases together, as only governing one case, as in this example, "after embracing and giving his blessing to his son," where, "embracing," requires an accusative case, and "giving," a dative. The same is to be observed in the regimen of nouns.

REGIMENT, in war, is a body of men, either horse or foot, commanded by a colonel.

Each regiment of foot is divided into companies, but the number of companies is not always alike, though our regiments generally consist of thirteen companies, one of which is always grenadiers.

Regiments of horse most commonly consist of six troops, but some have nine. Regiments of dragoons, in time of war, are generally composed of eight troops, and in time of peace, of six. Each regiment has a chaplain and a surgeon. See the articles Troop and Company.

Some german regiments consist of two thousand foot, and the regiment of Picardy in France, consists of 120 companies, or 6000 men.

REGIO ASSENSU, a writ by which the king gives his royal assent to the election of a bishop.

REGION, in geography, a large extent of land, inhabited by many people of the same nation, and inclosed within certain limits or bounds.

The modern astronomers divide the moon into several regions, or large tracts of land, to each of which they give its proper name.

Region, in physiology, is taken for a division of our atmosphere, which is divided into the upper, middle, and lower regions.

The upper region commences from the tops of the mountains, and reaches to the

the utmoſt limits of the atmoſphere. In this region reigns a perpetual, equable, calmneſs, clearneſs and ſerenity. The middle region is that in which the clouds reſide, and where meteors are formed, extending from the extremity of the loweſt to the tops of the higheſt mountains. The loweſt region is that in which we breathe, which is bounded by the reflection of the ſun's rays; or by the height to which they rebound from the earth. See ATMOSPHERE and AIR.

*Æthereal* REGION, in coſmography, is the whole extent of the univerſe, in which is included all the heavenly bodies, and even the orb of the fixed ſtars. See the article ÆTHER.

*Elementary* REGION, according to the Ariſtotelians, is a ſphere terminated by the concavity of the moon's orb, comprehending the atmoſphere of the earth.

REGION, in anatomy, a diviſion of the human body, otherwiſe called cavity, of which anatomiſts reckon three, *viz.* the upper region, or that of the head; the middle region, that of the thorax or breaſt; and the lower, the abdomen, or belly. See the articles HEAD, THORAX, and ABDOMEN.

REGISTER, a public book, in which is entered and recorded memoirs, acts and minutes, to be had recourſe to occaſionally, for knowing, and proving matters of fact.

Of theſe there are ſeveral kinds; as, 1. Regiſters of deeds in Yorkſhire and Middleſex, in which are regiſtered all deeds, conveyances, wills, &c. that affect any lands or tenements in thoſe counties, which are otherwiſe void againſt any ſubſequent purchaſers, or mortgagees, &c. but this does not extend to any copyhold eſtate, nor to leaſes at a rack-rent, or where they do not exceed twenty-one years. The regiſtered memorials muſt be ingroſſed on parchment, under the hand and ſeal of ſome of the grantors or grantees, atteſted by witneſſes who are to prove the ſigning or ſealing of them, and the execution of the deed.

But theſe regiſters which are confined to two counties, are in Scotland general, by which the laws of North Britain are rendered very eaſy and regular. Of theſe there are two kinds; the one general, fixed at Edinburgh, under the direction of the lord-regiſter; and the other is kept in the ſeveral ſhires, ſtewarties, and regalities, the clerks of which are obliged to tranſmit the regiſters of their reſpective courts to the general regiſter. No man in Scotland, can have a right to any eſtate, but it muſt become regiſtered within forty days of his becoming ſeiſed thereof; by which means all ſecret conveyances are cut off. 2. Pariſh regiſters, are books in which are regiſtered the baptiſms, marriages, and burials of each pariſh.

REGISTER, is alſo uſed for the clerk or keeper of a regiſter.

Of theſe we have ſeveral, denominated from the regiſters they keep; as regiſter of the high court of delegates; regiſter of the arches court of Canterbury; regiſter of the court of admiralty; regiſter of the prerogative court; regiſter of the garter, &c.

REGISTER SHIPS, in commerce, are veſſels which obtain a permiſſion either from the king of Spain, or the council of the Indies, to traffic in the ports of the Spaniſh Weſt-Indies; which are thus called, from their being regiſtred before they ſet ſail from Cadiz, for Buenos Ayres. Each of theſe permiſſions coſts 30,000 pieces of eight, and by the tenor of the cedula, or permit, they are not to exceed 300 tons; but there is ſuch a good underſtanding between the merchants, and the council of the Indies, that ſhips of 5 or 600 tuns frequently paſs unnoted; and though the quantity and quality of the merchandizes on board are always expreſſed, yet, by means of preſents, the officers both in Spain and the Indies, allow them to load and unload, vaſtly more than the permiſſion expreſſes.

REGISTER, in printing, is diſpoſing the forms on the preſs, ſo as that the lines and pages printed on one ſide of the ſheet, fall exactly on thoſe of the other.

REGISTER, among letter-founders, is one of the inner parts of the mould, in which the printing types are caſt. See the article *Letter* FOUNDERY.

Its uſe is to direct the joining the mould juſtly together again, after opening it to take out the new caſt letter.

REGISTERS, in chemiſtry, are holes, or chinks with ſtopples, contrived in the ſides of furnaces, to regulate the fire; that is, to make the heat more intenſe, or remiſs, by opening them to let in the air, or keeping them cloſe to exclude it. There are alſo regiſters in the ſteam-engine. See the article ENGINE.

REGISTRY, the office, books, and rolls, in

in which the proceedings in chancery, or any spiritual court, are registred.

REGIUS *professor*. See PROFESSOR.

REGLET, or RIGLET, in architecture, a flat narrow moulding, used chiefly in pannels and compartiments, to separate the parts or members from one another, and to form knots, frets, and other ornaments.

REGLETS, or RIGLETS, in printing, are thin slips of wood, exactly plained to the size of the body of the letter.

The smaller sorts are placed between the lines of poetry, and both those and the larger are used in filling up short pages, in forming the whites or distances between the lines of titles, and in adjusting the distances of the pages in the chase, so as to form register. See the articles REGISTER and PRINTING.

REGRATOR, or REGRATER, in law, formerly signified one who bought wholesale, or by the great, and sold again by retail: but the term is now used for one who buys any wares or victuals, and sells them again in the same market, or fair, or within five miles round it. See the article FORESTALLING.

REGRATOR, is also used for one who furbishes up old moveables to make them pass for new. And masons, who take off the outward surface of hewn stone, in order to whiten it, or make it look fresh again, are said to regrate.

REGULAR, denotes any thing that is agreeable to the rules of art: thus, we say a regular building, verb, *&c.* See BUILDING, VERB, *&c.*

A regular figure, in geometry, is one whose sides, and consequently angles, are equal; and a regular figure with three or four sides, is commonly termed an equilateral triangle, or square, as all others with more sides are called regular polygons. See the articles TRIANGLE, SQUARE, and POLYGON.

All regular figures may be inscribed in a circle. See the articles CIRCLE, PENTAGON, HEXAGON, *&c.*

A regular solid, called also a platonic body, is that terminated on all sides by regular and equal planes, and whose solid angles are all equal. See SOLID.

The regular bodies are the five following: 1. The tetrahedron, which is a pyramid, comprehended under four equal and equilateral triangles. 2. The hexahedron, or cube, whose surface is composed of six equal squares. 3. The octahedron, which is bounded by eight equal and equilateral triangles. 4. The dodecahedron, which is contained under twelve equal and equilateral pentagons. 5. The icosihedron, consisting of twenty equal and equilateral triangles. These five are all the regular bodies in nature. See TETRAHEDRON, *&c.*

The proportion of the sphere, and of the five regular bodies inscribed in the same circle from Peter Horigon. Cursus Math. vol. i. p. 779. and Barrow's Euclid, lib. xiii.

The diameter of the sphere being 2.

| | |
|---|---|
| The circumference of the greatest circle is — — | 6.28318 |
| Superficies of the greatest circles | 3.14159 |
| Superficies of the sphere - | 12.56637 |
| Solidity of the sphere - | 4.18859 |
| Side of the tetrahedron - | 1.62299 |
| Superficies of a tetrahedron - | 4.6188 |
| Solidity of a tetrahedron - | 0.15132 |
| Side of a cube or hexahedron | 1.1547 |
| Superficies of the hexahedron | 8. |
| Solidity of the hexahedron - | 1.5396 |
| Side of an octahedron - | 1.41421 |
| Superficies of the octahedron - | 6.9282 |
| Solidity of the octahedron - | 1.33333 |
| Side of the dodecahedron - | 0.71364 |
| Superficies of the dodecahedron | 10.51462 |
| Solidity of the dodecahedron | 2.78516 |
| Side of the icosihedron - | 1.05146 |
| Superficies of the icosihedron | 9.57454 |
| Solidity of the icosihedron - | 2.53615 |

If one of these five regular bodies were required to be cut out of the sphere of any other diameter, it will be as the diameter of the sphere 2 is to the side of any one solid inscribed in the same (suppose the cube 1.1547) so is the diameter of any one sphere (suppose 8) to 9.2376, the side of the cube inscribed in this latter sphere.

Let $dr$ (plate CCXXXI. fig. 2.) be the diameter of any sphere, and $da$ $\frac{1}{3}$ of it $= ab = br$. Erect the perpendiculars $ae$, $cf$, and $bg$, and draw $de$, $df$, $er$, $fr$, and $gr$. Then will

1. $re$ be as the side of the tetrahedron.
2. $df$ is the side of the hexahedron.
3. $de$ is the side of the octahedron.
4. Cut $de$ in extreme and mean proportion in $h$, and $dh$ will be the side of the dodecahedron.
5. Set the diameter $dr$ up, perpendicularly at $r$, and from the center $c$, to its top, draw the line $cg$, cutting the circle in $g$. Let fall the perpendicular $gb$; then is $br$ the side of the icosihedron.

REGU-

REGULAR *curves*, such as proceed gradually in the same geometrical manner, with regard to their curvities. See the article CURVE.

REGULAR, in a monastery, a person who has taken the vows; because he is bound to observe the rules of the order he has embraced. See the article MONK.

REGULAR *priest*, a priest in some religious order; in contradistinction to a secular priest, or one that lives in the world at large. See the article PRIEST.

REGULAR *places*, those contained within the boundary or inclosure of the convent. See the article CONVENT.

REGULATION, a rule or order prescribed by a superior, for the proper management of some affair.

REGULATOR *of a watch*, the small spring belonging to the ballance; serving to adjust its motions, and make it go faster or slower. See WATCH.

REGULUS, in ornithology, the name of several birds of the motacilla-kind, as, 1. The crested regulus, about the size of the common wren; the head, neck, and back of which are of a mixed colour of greenish and grey, its breast and belly of a pale grey, and its wings variegated with black and yellow; the head in the male is ornamented with an orange-coloured crest or crown; whence the names regulus, tryannus, *&c.* 2. The yellow wasted, greyish green regulus, without a crest: this is a very elegant little bird, about the size of the former species; the sides of its head are ornamented with an oblong yellow line, running from the eyes to the hinder part of the head. See plate CCXXXI. fig. 3.

REGULUS, in chemistry, an imperfect metallic substance, that falls to the bottom of the crucible, in the melting of ores, or impure metallic substances.

This operation almost always requires the addition of such ingredients as take away the mutual connection between the parts to be separated; that is, the menstrual virtue, by means of which one keeps the other in a state of dissolution. For instance, the reguline part of antimony, and mineral sulphur, mutually dissolve each other, and constitute crude antimony; nor can they be separated by fire alone without destroying the regulus: but if you add iron, copper, silver, *&c.* which are more thoroughly penetrated by sulphur, then the regulus of antimony is freed of the sulphur, and being heavier than the additional bodies then joined to it, sinks to the bottom. See FLUX.

Regulus of antimony is of three kinds, *viz.* the regulus of antimony, simply so called, martial regulus of antimony, and stellated regulus of antimony. 1. The first is prepared as follows: Take antimony, nitre, and crude tartar, of each equal parts; grind them separately into a powder, then mix, and rub them all together; after which, throw the powder by degrees into a red hot crucible, taking care to break the crust, which forms on the surface, with an iron rod; when the detonation is over, let a strong fire be made, that the matter may flow like water, then pour it out into a warm greased cone, which is to be gently struck on the sides, that the regulus may separate and fall to the bottom; when grown cold, let the regulus be cleaned from the scoriæ that lie a-top of it. 2. Martial regulus of antimony is thus made: take antimony and nitre of each a pound; and crude tartar half a pound; and small pieces of iron, half a pound: heat the iron in a crucible to a white heat: then gradually add the other ingredients, first powdered and mixed together, and proceed in the same manner as in the foregoing process. 3. Stellated regulus of antimony is made by melting the martial regulus several times with fresh nitre and tartar.

The foregoing reguli are at present rarely, if ever, made use of in medicine: the emetic cups, and perpetual pills, formerly made from them, have long been laid aside, as precarious and unsafe; but the scoriæ produced in these several processes, afford medicines less violent, some of which are in considerable esteem. However, they are of use in several mechanic arts, and particularly in mixing with tin, in making pewter. See PEWTER.

REGULUS, in astronomy, a star of the first magnitude, in the constellation leo, called also from its situation, *cor leonis*, or the lion's heart.

Its longitude, according to Mr. Flamstead, is 25° 31′ 20″, and its latitude 0° 26′ 38″ north.

REHABILITATION, in the civil and canon law, the restoring a delinquent to his former condition.

REHEARSAL, in music, and the drama, an essay or experiment of some composition generally made in private, previous to its representation or performance in public, in order to render the actors and per-

performers more perfect in their parts.

REIMBURSEMENT, in commerce, the act of repaying another the expences he has been at on our account.

REIN-DEER, in zoology, a species of the cervus, with horns ramose and cylindric, with their tops palmated. See the article CERVUS.

This is a large and beautiful species, not inferior to the elk in size or strength, but greatly exceeding it in form; it is of the size of a small horse, but its shape is exactly that of the red-deer. It is a native of the northern regions, there being no country so far north as not to afford it, where it is of vast use to the inhabitants, as a beast of draught.

REINFORCED, or RENFORCED RING, of a cannon, is the next after the trunnions, betwixt them and the touch-hole.

REINFORCEMENT, in war, a fresh supply of men, arms, ammunition, &c.

REINTEGRATION. See the article REDINTEGRATION.

REINS, in anatomy, the same with kidneys. See KIDNEYS.

REINS *of a bridle*, are two long slips of leather, fastened on each side of a curb or snaffle, which the rider holds in his hand, to keep his horse in subjection.

There is also what is called false reins, which is a lath of leather, passed sometimes through the arch of the banquet, to bend the horse's neck.

REINSTATING, restoring a person or thing, to its former state or condition.

REJOINTING, in architecture, filling up the joints of the stones in buildings. This ought to be performed with the best mortar, as that of lime and cement, and sometimes with plaster, as in the joints of vaults.

REJOYNDER, or REJOINDER, in law, is the defendant's answer to the plaintiff's replication or reply. Thus, in the court of chancery, the defendant puts in an answer to the plaintiff's bill, which is sometimes also called an exception; the plaintiff's answer to this is called a replication, and the defendant's answer to that a rejoynder.

REIS, RE, or RES. See REE.

REITERATION, the act of repeating a thing, or doing it a second time.

RELAPSE, a falling again into a danger, evil, or disease, from which a person has escaped.

RELATION, *relatio*, in philosophy, the mutual respect of two things, or what each is with regard to the other.

The idea of relation is acquired, by comparing one thing with another; and the denominations given to the respect, which they bear to each other, are termed relatives, and the things themselves related.

Relations make the largest class of our perceptions, since every single object admits of almost innumerable comparisons with others: thus, if we compare one thing with another in respect of bulk, we get the ideas of greater, less, or equality; if in respect of time, of older and younger; and so for other relations, which we can pursue at pleasure, almost without end; whence it is easy to conceive, how very extensive this tribe of our perceptions must be. However, here, as well as in the other kinds of our complex ideas, we bound ourselves for the most part to such comparisons, as the exigencies of society, the wants of life, and the different professions of men render necessary; and are more or less accurate in tracing out the relations of things, according to the degree of importance they appear to have in these respects. The relations of men one to another, arising either from the ties of blood, their several ranks and places in the community, or a mutual intercourse of good offices, being of great weight and concern in the commerce of life, have in a particular manner engaged our attention, and are therefore very minutely described. For the same reason men have found it necessary, to determine as exactly as possible, the various dependence of things, as their happiness is nearly connected with this knowledge. When we consider objects merely in respect of existence, as either giving or receiving it, we come by the relative ideas of cause and effect, which are very nearly connected with the welfare of mankind; it being evident, that the several schemes and purposes of life are all conducted upon a previous supposition, that certain known causes will have their usual regular effects, and such and such actions be attended with such and such consequences. See the articles CAUSE, EFFECT, and EXPERIMENTAL PHILOSOPHY.

But there are other relations of this kind, as when we also take in the additional gifts of a capacity for happiness, and the means of attaining it; which constitutes the relation of creator and creature, in the more solemn acceptation of

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of these words. Again, when we consider the great author of our being, not only as the creator of the universe, but also as preserving and holding it together, and presiding over the present frame of things with uncontrouled dominion; he then appears under the notion of a moral governor, to whom we are accountable for our actions, and the use we make of those powers and faculties we derive from him. And thus we may, in some measure, perceive, how the mind proceeds in comparing its ideas together, and by what views it is chiefly governed in framing the compound notions of this class, by which it represents the various habitudes of things.

We shall only add two more observations upon this subject: 1. That our ideas of relations are, for the most part, very clear and distinct; for the comparing of things together being a voluntary act of the mind, we cannot but suppose it must be acquainted with its own views in the comparison; and, of course, have a clear conception of the foundation of that relation; and what is still more remarkable of the ideas of this class, they cease not to be distinct, even when the subjects compared are but imperfectly known; for though we cannot comprehend the manner of the world's being created, yet we find no difficulty in framing the ideas the relative words creator and creature stand for. 2. Our ideas of relations are among the most important conceptions of the understanding, and afford the largest field for the exercise and improvement of human knowledge. See the article KNOWLEDGE.

Moral actions are nothing but relations, it being their conformity or disagreement with some rule that makes them either good or bad, or indifferent; and indeed, we ought carefully to distinguish between the positive idea or the action, and the reference it has to a rule. Thus, the taking from another what is his, without his consent, is properly called stealing; but that name being commonly understood to signify also the moral pravity of the action, men are apt to condemn whatever they hear called stealing as an ill action, disagreeing with the rule of right: and yet the private taking away his sword from a madman, to prevent his doing mischief, though it be properly denominated stealing, is nevertheless agreeable to the law of God. See the articles ETHICS and MORALITY.

It would be infinite to go over all sorts of relations; we have therefore contented ourselves with mentioning some of the most considerable, and such as may serve to let us see from whence we get our ideas or relations, and wherein they are founded.

RELATION, among the ancient logicians, constituted one of the ten categories, or predicaments. See CATEGORY.

RELATION, in geometry, signifies the same with ratio. See RATIO.

RELATION, in grammar, is the correspondence which words have to one another in construction.

RELATION is also used for analogy. See the article ANALOGY.

RELATION, in law, is where two times, or other things, are considered as if they were one and the same; and by this the thing subsequent is said to take its effect, by relation, from the time preceding: thus, in case of a deed of bargain and sale inrolled, the inrollment shall have relation to the delivery thereof; and in our courts, a judgment has always relation to the first day of term.

RELATIVE, something relating to, or respecting, another. See the preceding article.

RELATIVE TERMS, in logic, are words which imply a relation: such are master and servant, husband and wife, *&c.*

In grammar, relative words are those which answer to some other word foregoing, called the antecedent: such are the relative pronouns, *qui*, *quæ*, *quod*, &c. and in english, *who*, *whom*, *which*, &c. The word answering to these relatives is often understood as, *I know whom you mean*, for, *I know the person whom you mean.*

RELAXATION, in medicine, *&c.* the act of loosening or slackening, or the looseness and slackness of the fibres, nerves, muscles, *&c.*

RELAXATION, in law, is the same with releasing. See the article RELEASE.

RELAY, a supply of horses placed on the road, and appointed to be ready for a traveller to change, in order to make the greater expedition.

In hunting, relay signifies fresh sets of dogs, or horses, or both, placed in readiness, in case the game comes that way, to be cast off, or to mount the hunters, in lieu of the former, which are supposed to want respite.

RELAY, in tapestry, is an opening left, where the colours and figures are to be

be changed, when the piece is finiſhed.

RELEASE, in law, is an inſtrument in writing, by which eſtates, rights, titles, entries, actions, and other things, are extinguiſhed and diſcharged; and ſometimes transferred, abridged, or enlarged: and, in general, it ſignifies one perſon's giving up or diſcharging the right or action he has, or claims to have, againſt another, or his lands, *&c.*

A releaſe may be either in fact or in law; a releaſe in fact is where it is expreſly declared, by the very words, as the act and deed of the party; and a releaſe in law is that which acquits by way of conſequence, as where a feme creditor takes the debtor to huſband.

The perſon releaſing is termed the releaſor, and he to whom the releaſe is made, the releaſee.

RELEGATION, a kind of baniſhment or exile, in which a perſon is ſentenced to retire to a certain place preſcribed, and to continue there a certain time, or till he is recalled.

In Rome, relegation was a leſs ſevere puniſhment than deportation, ſince he who was relegated, neither loſt the rights of a roman citizen, nor thoſe of his family, as the authority of a father over his children, *&c.*

RELICS, in the romiſh church, the remains of the bodies or cloaths of ſaints or martyrs, and the inſtruments by which they were put to death, devoutly preſerved, in honour to their memory; kiſſed, revered, and carried in proceſſion.

This is a piece of ſuperſtition which began very early in the chriſtian church, and at preſent makes no inconſiderable article of popery. The ſhrines in which they are depoſited are firſt ſprinkled with holy water and ſolemnly bleſſed. The ſubſtance of the prayer on this occaſion is, that God would grant his protection to ſuch as revere the merits of his ſaints, and humbly embrace their relics; to the end that theſe faithful ſupplicants may be guarded from the power of the devil, from thunder, plague, bad air, wild beaſts, and from the hoſtilities and machinations of men.

The catacombs are an inexhauſtible fund of relics; yet it is ſtill diſputed who were the perſons interred in them. See the article CATACOMB.

The tranſlation of relics, or depoſiting them in ſome church, is performed with great care and ceremony. Before they are tranſlated, they are examined by the biſhop, who pronounces a ſolemn benediction over them. On the day of their tranſlation, the houſes in the ſtreets thro' which they paſs, are covered with tapeſtry: the church and altar are pompouſly adorned, and the images of the ſaints ranged in open view. The relics are carried in proceſſion under a canopy, the clergy walking before, and the people ſurrounding them with lighted tapers in their hands. As ſoon as they enter the church, Te Deum is ſung, and the relics are ſet upon the altar. Prayers are appointed in honour of them, and a lamp is left burning day and night before the place where they are afterwards depoſited.

RELICT, in law, the ſame with widow. See the article WIDOW.

RELIEF, in law, a certain ſum of money which every freehold-tenant, being at age, formerly paid, and in ſome places ſtill pays to his lord, on his entrance upon the inheritance of his anceſtor's lands, *&c.* by the payment of which money the heir is ſaid to relieve, or raiſe again the lands, after they were fallen into the ſuperior's hands.

A perſon may hold lands of another, by rent, and a cuſtomary relief, which is only payable by freeholders; and for which the lord may diſtrain, but cannot bring an action of debt, though his executors may. Theſe reliefs are, in ſome places, half a year, or a year's rent, and the profits of the lands; and in others, double the ſame for that year.

RELIEF, in chancery, is an order ſued out, for diſſolving contracts and other acts, on account of their being unreaſonable, prejudicial, or grievous; or from ſome other nullity, either de jure, or de facto.

RELIEF *of a hare*, among hunters, is the place where ſhe goes to feed in an evening.

RELIEF, in ſculpture. See RELIEVO.

RELIEVE, in a military ſenſe, is to ſend off thoſe men that are upon duty, and to bring others to take their place: thus, to relieve the guard, the trenches, *&c.* is to bring freſh men upon duty, and to diſcharge thoſe who were upon duty before.

RELIEVO, or RELIEF, in ſculpture, *&c.* is the projecture or ſtanding out of a figure, which ariſes prominent from the ground or plan on which it is formed; whether that figure be cut with the chiſſel, moulded, or caſt.

There are three kinds or degrees of relievo, *viz.* alto, baſſo, and demi-relievo. The

The alto-relievo, called alſo haut-relief, or high-relievo, is when the figure is formed after nature, and projects as much as the life. Baſſo-relievo, baſs-relief, or low-relievo, is when the work is raiſed but a little from the ground, as in medals, and the frontiſpieces of buildings; and particularly in the hiſtories, feſtoons, foliages, and other ornaments of friezes. Demi-relievo is when one half of the figure riſes from the plan. When, in a baſſo-relievo, there are parts that ſtand clear out, detached from the reſt, the work is called a demi-baſſo.

In architecture, the relievo or projecture of the ornaments, ought always to be proportioned to the magnitude of the building it adorns, and to the diſtance at which it is to be viewed.

RELIEVO, or RELIEF, in painting, is the degree of boldneſs with which the figures ſeem, at a due diſtance, to ſtand out from the ground of the painting.

The relievo depends much upon the depth of the ſhadow, and the ſtrength of the light; or on the height of the different colours, bordering on one another; and particularly on the difference of the colour of the figure from that of the ground: thus, when the light is ſo diſpoſed as to make the neareſt parts of the figure advance, and is well diffuſed on the maſſes, yet inſenſibly diminiſhing, and terminating in a large ſpacious ſhadow, brought off inſenſibly, the relievo is ſaid to be bold, and the clair obſcure well underſtood.

RELIGION, that worſhip and homage which is due to God, conſidered as our creator, preſerver, and moſt bountiful benefactor.

As our affections depend on our opinions of their objects, it ſeems to be among the firſt duties we owe to the author of our being, to form the leaſt imperfect, ſince we cannot form perfect, conceptions of his character and adminiſtration: for ſuch conceptions will render our religion rational, and our diſpoſitions refined. If our opinions are diminutive and diſtorted, our religion will be ſuperſtitious, and our temper abject. Thus, if we aſcribe to the Deity that falſe majeſty, which conſiſts in the unbenevolent and ſullen exerciſe of mere will or power, or ſuppoſe him to delight in the proſtrations of ſervile fear, or as ſervile praiſe, he will be worſhiped with mean adulation, and a profuſion of compliments. If he be looked upon as a ſtern and implacable being, delighting in vengeance, he will be adored with pompous offerings, or whatever elſe may be thought proper to ſooth and mollify him. But if we believe perfect goodneſs to be the character of the ſupreme Being, and that he loves thoſe who reſemble him moſt, in this, the moſt amiable of his attributes, the worſhip paid him will be rational and ſublime, and his worſhipers will ſeek to pleaſe him by imitating that goodneſs which they adore. Indeed, wherever right conceptions of the Deity, and his providence, prevail, when he is conſidered as the inexhauſted ſource of light, and love, and joy, as acting in the joint character of a father and governor, what veneration and gratitude muſt ſuch conceptions, thoroughly believed, excite in the mind? how natural and delightful muſt it be, to one whoſe heart is open to the perception of truth, and of every thing fair, great, and wonderful in nature, to engage in the exerciſes of religion, and to contemplate and adore him, who is the firſt fair, firſt great, and firſt wonderful; in whom wiſdom, power, and goodneſs dwell vitally, eſſentially, and act in perfect concert? what grandeur is here, to fill the moſt enlarged capacity, what beauty to engage the moſt ardent love, what a maſs of wonders, in ſuch exuberance of perfection, to aſtoniſh and delight the human mind, through an unfailing duration! When we conſider the unſullied purity, and abſolute perfection of the divine nature; and reflect on the imperfection and various blemiſhes of our own, and the ungrateful returns we have made to his goodneſs, we muſt ſink, or be convinced we ought to ſink, into the deepeſt humility and proſtration of ſoul before him, and be conſcious that it is our duty to repent of a temper and conduct ſo unworthy of our nature, and ſo unbecoming our obligations to its author; and to reſolve and endeavour to act a wiſer and a better part for the future. And if the Deity is conſidered as the father of mercies, who loves his creatures with infinite tenderneſs, and, in a particular manner, all good men; nay, who delights in goodneſs even in its moſt imperfect degrees; what reſignation, what dependence, what generous confidence, what hope in God, and in his all-wiſe providence, muſt ariſe in the ſoul that is poſſeſſed of ſuch amiable views of him. We muſt further obſerve, that all thoſe affections which regard the Deity as their immediate and primary object, are

vital energies of the foul, and consequently exert themselves into act, and, like all other energies, gain strength or greater activity by that exertion: it is therefore our duty, as well as highest interest, often, at stated times, and by decent and solemn acts, to adore the great original of our existence, to express our veneration and love by a devout recognition of his perfections, and to evidence our gratitude by celebrating his goodness, and thankfully acknowledging all his benefits; by proper exercises of sorrow and humiliation to confess our ingratitude and folly, to signify our dependence on God, our confidence in his goodness, and our resignation to the disposals of his providence, and this not only in private, but in public worship, where the presence of our fellow-creatures and the powerful contagion of the social affections, conspire to kindle and spread the devout flame with greater warmth and energy.

Religion is divided into natural and revealed: by natural religion is meant that knowledge, veneration, and love of God, and the practice of those duties to him, our fellow-creatures, and ourselves, which are discoverable by the right exercise of our rational faculties, from considering the nature and perfections of God, and our relation to him and to one another. See ETHICS.

And by revealed religion is meant, natural religion explained, enforced, and enlarged, from the express declarations of God himself, from the mouths or pens of his prophets, *&c.*

Religion, in a more contracted sense, is used for that system of faith and worship, which obtains in several countries of the world; and even for the various sects into which each religion is divided. See the articles PAGANISM, MAHOMETANS, JEWS, *&c.* ROMAN, LUTHERANS, CALVINISTS, *&c.*

RELIGIOUS, in popish countries, is particularly used for a person engaged, by solemn vows, to the monastic life: or a person shut up in a monastery, to lead a life of devotion and austerity, under some rule or institution. See the articles MONK, NUN, *&c.*

RELIQUARY, a shrine or casket, wherein the relics of a dead saint are kept.

RELIQUÆ, in roman antiquity, the ashes and bones of the dead, that remained after burning their bodies; which were gathered up, put into urns, and afterwards deposited in tombs. This word is also used for relics. See RELICS.

RELL-MOUSE, in zoology, the white bellied mus, with a blackish back and a long body. See the article MUS.

This creature is not so thick in the body as the common rat, but is longer, and approaches in some degree to the form of the weasel; the head is oblong, large at the upper part, but very slender at the snout; both the jaws are equal in length, and the upper lip is split, as in the hare; the teeth are long, slender, and sharp; the eyes are black and prominent; the ears are short, naked, and obtuse; the tail is short and hairy; and the legs are short, especially the anterior pair.

REMAINDER, in law, is an estate in lands, tenements, or rents, not to be enjoyed till after a term of years, or another person's decease: thus, a person grants lands or tenements to one person, for a term of years, or for life, and the remainder to another person for life, or in fee.

There is this difference between a remainder and a reversion; in case of a reversion, the estate granted, after the limited time, reverts to the grantor or his heirs; but by a remainder it goes to some third person, or a stranger.

REMAINDER, in mathematics, is what is left after taking a lesser number out of a greater.

REMARRYING, marrying a second time. See the article MARRIAGE.

REMEDY, in medicine, a preparation applied either internally or externally, for the cure of a disease. See PRESCRIPTION.

REMEMBRANCE, the same with memory. See the article MEMORY.

REMEMBRANCERS, antiently called clerks of the remembrance, certain officers in the exchequer, whereof three are distinguished by the names of the king's remembrancer, the lord treasurer's remembrancer, and the remembrancer of the first-fruits. The king's remembrancer enters in his office, all recognizances taken before the barons, for any of the king's debts, for appearances or observing of orders; he also takes all bonds for the king's debts, *&c.* and makes out processes thereon. He likewise issues processes against the collectors of the customs, excise, and others, for their accounts; and informations upon penal statutes, are entered and sued in his office, where all proceedings in matters upon english bills in the exchequer-chamber, remain. His duty further is to make out the bills of compositions upon penal laws, to take the

the ftatement of debts; and into his office are delivered all kinds of indentures and other evidences, which concern the affuring any lands to the crown. He, every year, in craftino animarum, reads in open court, the ftatute for election of fheriffs; and likewife openly reads in court, the oaths of all the officers, when they are admitted.

The lord treafurer's remembrancer is charged to make out procefs againft all fheriffs, efcheators, receivers, and bailiffs, for their accounts. He alfo makes out writs of fieri facias, and extent for debts due to the king, either in the pipe or with the auditors; and procefs for all fuch revenue as is due to the king, on account of his tenures. He takes the account of fheriffs; and alfo keeps a record, by which it appears whether the fheriffs or other accountants pay their profers due at Eafter and Michaelmas: and at the fame time he makes a record, whereby the fheriffs or other accountants keep their prefixed days: there are likewife brought into his office, all the accounts of cuftomers, comptrollers, and accountants, in order to make entry thereof on record; alfo all eftreats and amercements are certified here, *&c.*

The remembrancer of the firft-fruits takes all compofitions and bonds for the payment of firft-fruits and tenths; and makes out procefs againft fuch as do not pay the fame.

REMINISCENCE, *reminifcentia*, that power of the human mind, whereby it recollects itfelf, or calls again into its remembrance fuch ideas or notions as it had really forgot: in which it differs from memory, which is a treafuring up of things in the mind, and keeping them there, without forgeting them. See the article MEMORY.

Hence memory may be confidered as a continual remembrance, and reminifcence as an uninterrupted memory. How near akin foever thefe two faculties may feem, yet they are generally found feparated fo, that they who excell in the one, are ufually defective in the other.

REMINISCERE, the fecond Sunday in lent. See the article LENT.

REMISSION, in phyfics, the abatement of the power, or efficacy of any quality, in oppofition to the increafe of the fame, which is called intenfion. In all qualities capable of intenfion and remiffion, the intenfion decreafes reciprocally as the fquares of the diftances from the center of the radiating quality increafe.

REMISSION, in medicine, is when a diftemper abates, but does not go quite off before it returns again, as is common in fevers, which do not quite intermit.

REMISSION, in law, *&c.* denotes the pardon of a crime, or the giving up the punifhment due thereto.

REMIT, in commerce. To remit a fum of money, bill, or the like, is to fend the fum of money, *&c.*

To remit is alfo ufed among bankers, for what is ufually given a banker, or as it were difcounted with him, for his giving a bill of exchange.

REMITTANCE, in commerce, the traffic or return of money from one place to another, by bills of exchange, orders, or the like.

This word is alfo ufed in fpeaking of the payment of a bill of exchange. It alfo fignifies the fee or reward given a banker, both of his wages and the different value of the fpecies in the places where you pay the money, and where he remits it.

REMITTER, in law. Where a perfon has two titles to lands, *&c.* and he comes to fuch lands by the laft title, which, proving defective, he fhall be reftored to, and adjudged in, by virtue of his former more antient title, this is called remitter. In cafe lands defcend to a perfon, that had right to them before, he fhall be remitted to his better title, if he pleafes. Where a tenant in tail makes a feoffment of land, upon condition, after whofe death, his iffue within age enters, for the condition broken, he fhall be firft in as a tenant in fee, and be remitted as heir to his father: yet if the heir is of age, it will be no remitter to him, who is to bring his writ of formedon againft the feoffee. Alfo if a tenant in tail infeoff his fon or heir apparent, at that time under age, and afterwards dies, this is a remitter to the heir; but here it would be otherwife, were he of full age. By a remitter of iffue in tail, all charges on the land are avoided; and where a perfon is remitted to an eftate for life, the dower claimed by a widow may be gone; in which cafe alfo an eftate is liable to be forfeited upon making a feoffment thereof, *&c.*

REMITTITUR, in law, an entry made in the king's bench, on a writ of error's abating in the exchequer chamber.

REMONSTRANCE, an expoftulation or humble

humble supplication, addressed to a king, or other superior, beseeching him to reflect on the inconveniences, or ill consequences of some order, edict, or the like. This word is also used for an expostulatory counsel, or advice; or a gentle and handsome reproof, made either in general, or particular, to apprize or correct some fault, &c.

REMORA, the SUCK-FISH, in ichthyology, a species of echeneis. See ECHENEIS. This singular fish grows to about nine inches in length, and more than two in diameter in the largest part of the body, which is near the head, whence it becomes gradually smaller to the tail; the back is convex, the belly flat, and the sides are rounded by means of the structure of its head. This fish applies itself firmly to any solid body that it pleases; and is frequently found sticking to the bottom of ships, and often to large fish. See plate CCXXX. fig. 3.

REMOUNT, in war. To remount the cavalry, is to furnish troopers or dragoons with fresh horses, instead of such as have been killed or disabled in the service.

REMOVER, in law, is where a suit is removed or taken out of one court into another; and is the opposite of remanding a cause, or sending it back into the same court from whence it was first called.

REMPLY, in heraldry, something filled up. The term is chiefly used to denote that the chief is quite filled up with a square piece of another colour, leaving only a bordure of the proper colour of the chief, about the said piece. See plate CCXXIX. fig. 6.

RENAL, something belonging to the reins or kidneys. See the article KIDNEYS. For the renal glands, in anatomy, see the article CAPSULÆ ATRABILIARIÆ.

RENCOUNTER, in the military art, an engagement of two little bodies or parties of forces; in which sense it stands in opposition to a pitched battle. See the article BATTLE.

In single combats, rencounter is used by way of contradistinction to a duel, when persons fall out and fight on the spot, without having premeditated the combat.

RENCOUNTRE, or RENCONTRE, in heraldry, is applied to animals when they shew the head in front, with both eyes, &c. or when the face stands right forward, as if they came to meet the person before them.

RENDER, in law, signifies to yield or return a thing; and it is frequently made use of, in the levying of a fine, which is either single, on which nothing is given or rendered back by the cognisee; or double, containing a grant or render back of rent, &c. out of the land, to the cognisor. In another sense of this word, it is observed, that there are some things in a manor which lie in prender, that is, which may be taken by the lord or his officer, when they happen without any offer made by the tenant, such as escheats, &c. and there are some that lie in render, *viz.* such as may be rendered or answered by the tenant, as rents, heriots, and other services.

RENDEZVOUS, or RENDEVOUS, a place appointed to meet in, at a certain day and hour.

RENEALMIA, in botany, a genus of the hexandria-monogynia class of plants, the corolla whereof is long, erect, and of the infundibuliform-kind; the tube is of the length of the calyx; the limb is short, plane, and divided into three segments; the fruit is an ovato-oblong capsule, rounded, pointed at the edge and marked with three furrows, formed of three valves, and containing three cells; the seeds are numerous, oblong, and have each a capillary plume.

RENEGATE, or RENEGADO, a person who has apostatized or renounced the christian faith, to embrace some other religion, particularly mahometanism.

RENES SUCCENTURIATI, in anatomy, the same with the capsulæ atrabiliariæ. See CAPSULÆ ATRABILIARIÆ.

RENFREW, a town of Scotland, the capital of the county of Renfrew, situated on the river Clyde, forty-six miles west of Edinburgh.

RENIFORM, something resembling the figure or shape of the kidneys. See the article KIDNEYS.

RENITENCY, *renitentia*, among philosophers, that force in solid bodies, whereby they resist the impulse of other bodies, or re-act as much as they are acted on. See the article RE-ACTION, &c.

RENNES, a city of France, capital of the province of Britany, situated on the river Villaine: west long. 1° 45′, north lat. 48° 5′.

RENNET. See the article RUNNET.

RENT, *reditus*, in law, a sum of money, or other consideration, issuing yearly out of lands or tenements.

Rents are usually distinguished into three kinds, *viz.* rent-service, rent-charge, and

and rent-sec. Rent-service is where a person holds lands of his lord by fealty and certain rent, whilst the reversion of lands continues in the grantor; and if his rent be behind-hand, the landlord may distrain for it, without any covenant, &c. Rent-charge is where a person, by deed, makes over his estate in fee-tail, or for term of life, where the whole interest does pass; yet, by the same deed, reserves to himself a sum of money, to be paid him yearly, with a clause therein, impowering him to distrain in case of non-payment. Rent-sec, or a dry-rent, is that which a person, making over his estate by deed, reserves yearly to be paid him, without any clause of distress contained in the deed.

To these may be added a rent reserved on leases at will, called rents distrainable of common right: but this rent is due by the possession only, which therefore must be proved; whereas in leases for years the rent becomes due on the contract, and the lessee must pay the same, though he never enters on the land. A person may also hold a rent by prescription, as where he and his ancestors have been seised thereof, and used to distrain for it, when in arrears, &c.

RENTAL signifies a roll in which the rents of manors are set down, in order for the lord's bailiff, thereby to collect the same. It contains the lands let to each tenant, with their names, and the several rents arising.

RENTERING, in the manufactories, the same with fine-drawing. See the article *Fine*-DRAWING.

RENVERSE', INVERTED, in heraldry, is when any thing is set with the head downwards, or contrary to its natural way of standing. Thus, a chevron renversé, is a chevron with the point downwards. They use also the same term when a beast is laid on its back.

RENUENTES, in anatomy, a pair of muscles of the head, thus called as being antagonists to the annuentes, and serving to throw the head backwards.

RENUNCIATION, *renunciatio*, the act of renouncing, abdicating, or relinquishing any right, real or pretended.

Renunciations are sometimes exprefs, as by contracts, &c. sometimes tacit, as by contrary acts. To renounce an inheritance, community, &c. is to pass a solemn act before a notary or public officer, whereby a person declares he will not intermeddle in an inheritance or profit in a company, but surrenders his part and quits all pretensions.

REPAIRING, or REPARATION, *reparatio*, the act of retrieving, mending, or establishing a building or other work damaged or gone to decay. In respect to reparations, if a tenant or lessee covenants that from and after the amendment of the tenements by the lessor he will, at his own charge, keep and leave them in repair, in that case the lessee is not obliged to do the same until the lessor has first made good the reparations; and here if a house be well repaired at first, when the lease began, and afterwards decays, it is said the landlord must put it in repair before the tenant is bound to keep it so.

REPARATIONE FACIENDA, is a writ that lies in divers cases, one of which is where there are tenants in common or joint tenants of a mill or house that is fallen to decay, and one of them is willing to repair the same, but the others will not, in which case the party that is willing to repair it shall have this writ against the persons refusing. Also if a person has a passage over a bridge, and another ought to repair the same, but suffers it to decay, &c. this writ lies.

REPARTEE, or REPARTY, a ready smart reply, especially in matters of wit, humour, or raillery.

REPARTITION, a dividing or sharing a thing a second time.

REPAST, a meal or refection taken at a stated hour.

In our old law-books it is particularly used for a meal's meat given to servile tenants while at work for their lord.

REPEALING, in law, the revoking or annulling of a statute, or the like. See ABROGATION and REVOCATION.

No act of parliament shall be repealed the same session in which it was made. A deed or will may be repealed for a part, and stand good for the rest. It is held that a pardon of felony may be repealed on disproving the suggestion thereof.

REPEAT, in music, a character shewing that what was last played or sung must be repeated or gone over again. See the article REPETITION.

The repeat serves instead of writing the same thing twice over: there are two kinds of repeats, the great and small; the first is a double bar dotted on each side, or a double bar dotted in the middle, or two parallel lines drawn perpendicularly across the staff, with dots on

on either hand. The form of which may be seen under CHARACTER *in music*. This shews that the preceding strain is to be repeated, that is, if it be near the beginning of the piece, all hitherto sung or played is to be repeated; or if towards the end thereof, all from such another mark. In gavots we usually find the repeat at about a third part of the piece. In minutes, borees, courants, &c. towards the end, or in the last strain: some make this a rule, that if there be dots on each side of the bars, they direct a repetition both of the preceding and following strains; if there be only dots on one side the strain, that side alone is to be sung or played over again. The small repeat is when some of the last measures of a strain are to be repeated. This is denoted by a character set over the place where the repeat begins (see CHARACTER *in music*) and continues to the end of the strain.

REPEATING WATCHES. See WATCH.

REPEHAM, a market-town of Norfolk, situated eight miles north-west of Norwich.

REPELLENTS, in medicine, remedies which drive back a morbid humour into the mass of blood from which it was unduly secreted. To understand rightly, says Quincy, the operation of repellents, it may be observed, that these are medicines which prevent such an afflux of a fluid to any particular part as would raise it into a tumour; but to know how this may be effected, we must advert, that all tumours arise either from an increase in the velocity or quantity of the fluids, or a weakness in some particular part; and sometimes both concur. An increase in the velocity of the fluids makes them more forcibly push against and distend all the parts in their circuit. If, therefore, any part be unequally pressed or relaxed by external injuries, that will be more elevated than any other, and for want of equal resistance with the rest of the body, will at length receive such a quantity of fluid as will raise it into a tumour, especially if any of its vessels be obstructed; because the protrusion of fresh matter a tergo, will continue to add thereto until the part is upon the utmost stretch, and can hold no more. In this case all those means are said to be repellent which check the growth of the tumour, and assist the refluent blood in taking up the obstructed matter, and washing it again into the common stream. This intention is chiefly answered by evacuation and revulsion; for whatever lessens the quantity of the fluid, will diminish the force upon the tumified part. A medicine comes to be repellent by consisting of such subtil parts as may transmit some of them through the pores, and help to render the obstructed matter more fluid, so that it comes the more easy to be loosened, and fall again into the circulating current. But in this case there is a hazard of such things likewise putting the obstructed humour into a ferment, whereby it sooner turns into pus, and then comes under the denomination of suppuratives or ripeners. What, therefore, in the most strict sense, is to be reputed a repeller, is that which astringes and strengthens the part so as to make it resist any such lodgment. These are such whose qualities are most manifest in their coldness and drying properties; but there are so few instances wherein bandage is not better than any such application, that very little comes to be used for that purpose. In hæmorrhages and ousings out of serum, so as to deform the skin, simples of this nature mostly take place, which answer their ends by astringing the fibres, whence those apertures are so closed as not to admit through them afterwards any such fluid. See TUMOUR, &c.

The most remarkable in the class of repellents are the white of an egg, the lapis calaminaris, litharge of gum, red-lead, tutty, pampholyx, house-leek, putty, and cowweb. See the article EGG, &c.

REPELLING POWER, *vis repellens*, in physics. See the article REPULSION.

REPERCUSSION, in mechanics. See the article REFLECTION.

REPERCUSSION, in music, a frequent repetition of the same sound. See the article REPETITION.

This often happens in the modullation, where the essential chords of each mode of the harmonical triad are to be struck oftener than the rest: and of these three chords the two extremes, *i. e.* the final and the predominant one (which are properly there percussions of each mode) oftener than the middle one.

REPERTORY, *repertorium*, a place wherein things are orderly disposed, so as to be easily found when wanted. The indices of books are repertories, shewing where the matters sought for are treated of. Common-place books are also kinds of repertories.

REPETITION, *repetitio*, the reiterating of an action.

REPETITION, in music, denotes a reiterating

ing or playing over again the fame part of a compofition, whether it be a whole ftrain, part of a ftrain, or double ftrain, &c. The repetition is denoted by a character called a repeat, which is varied fo as to exprefs the various circumftances of a repeat. See the article REPEAT.

When the fong ends with a repetition of the firft ftrain, or part of it, the repetition is denoted by *da capo*, or D. C. *i. e.* from the beginning.

Repetition or reply is alfo ufed in mufic when after a little filence one part repeats or runs over the fame notes, the fame intervals, the fame motions, and, in a word, the fame fong which a firft part had already gone over during the filence of this, and is nearly the fame with figure. See FIGURE and IMITATION.

Repetition, or reply, is alfo a doubling trebling, &c. of an interval or reiteration of fome confonance or diffonance, as a fifteenth is a repetition of the octave, *i. e.* double octave, or fecond octave. See the articles OCTAVE and INTERVAL.

REPETITION, in rhetoric, a figure which gracefully and emphatically repeats either the fame word, or the fame fenfe in different words.

In the ufe of this figure care is to be ufed that we run not into infipid tautologies, nor affect a trifling found and chime of infignificant words. All turns and repetitions are fo that do not contribute to the ftrength and luftre of the difcourfe, or at leaft one of them. The nature and defign of this figure is to make deep impreffions on thofe we addrefs. It expreffes anger and indignation, full affurance of what we affirm, and a vehement concern for what we have efpoufed.

REPLANTING, in gardening, the act of planting a fecond time. See PLANTING.

REPLEADER, *replacitare*, in law, is to plead over again what was once pleaded before.

REPLEGIARE, in law, fignifies to redeem a thing taken or detained by another, by putting in legal fureties.

REPLEGIARE DE AVERIIS, is a writ which is brought by him whofe cattle is diftrained or impounded for any caufe by another perfon, on fecurity being given to the fheriff to profecute or anfwer the action at law.

REPLETION, in medicine, a plenitude or plethora. See PLETHORA.

Repletion is more dangerous than inanition. Bleeding and diet are the great refources whence a perfon is incommoded with a repletion.

Repletion is fometimes alfo ufed where the ftomach is overloaden with too much eating or drinking. The phyficians hold all repletion to be prejudicial, but that of bread is of all others the worft.

REPLETION, in the canon law, is where the revenue of a benefice or benefices is fufficient to fill or occupy the whole right or title of the graduate who holds them. Where there is a repletion, the party can demand no more by virtue of his degrees. In England, where benefices are not appropriated to degrees, repletion, ftrictly fpeaking, has no place.

REPLEVIN, in law, a remedy granted on a diftrefs, by which the firft poffeffor has his goods reftored to him again, on his giving fecurity to the fheriff that he will purfue his action againft the party diftraining, and return the goods or cattle, if the taking them fhall be adjudged lawful.

In a replevin the perfon diftrained becomes plaintiff, and the perfon diftraining is called the defendant or avowant, and his juftification an avowry.

At the common law replevins are by writ, either out of the king's bench or common pleas; but by ftatute, they are by plaint in the fheriff's court, and court-baron, for a perfon's more fpeedily obtaining the goods diftrained.

If a plaint in replevin be removed into the court of king's bench, &c. and the plaintiff makes default and becomes nonfuit, or judgment is given againft him, the defendant in replevin fhall have the writ of retorno habendo of the goods taken in diftrefs. See REPLEVY.

REPLEVISH, in law, fignifies to admit one to mainprife upon furety. See the article MAINPRISE.

REPLEVY, in law, is a tenant's bringing a writ of replevin, or replegiari facias, where his goods are taken by diftrefs for rent; which muft be done within five days after the diftrefs, otherwife at the five days end, they are to be appraifed and fold. 2 W. and M. c. 5.

This word is alfo ufed for bailing a perfon, as in the cafe of a homine replegiando.

REPLICATION, in logic, the affuming or ufing the fame term twice in the fame propofition.

REPLICATION, in the courts of common law, fignifies an exception or anfwer made by

by the plaintiff to the defendant's plea; in the court of chancery, it is what the complainant replies to the defendant's anſwer.

REPORT, the relation made upon oath, by officers or perſons appointed to viſit, examine, or eſtimate the ſtate, expences, &c. of any thing.

REPORT, in law, is a public relation of caſes judicially argued, debated, reſolved or adjudged in any of the king's courts of juſtice, with the cauſes and reaſons of the ſame, as delivered by the judges. Alſo when the court of chancery, or any other court, refers the ſtating of a caſe, or the comparing of an account to a maſter of chancery, or other referee, his certificate thereon is called a report.

REPOSE, in poetry, &c. the ſame with reſt and pauſe. See REST, &c.

REPOSE, in painting, certain maſſes or large aſſemblages of light and ſhade, which being well conducted, prevent the confuſion of objects and figures, by engaging and fixing the eye ſo as it cannot attend to the other parts of the painting for ſome time; and thus leading it to conſider the ſeveral groups gradually, proceeding, as it were, from ſtage to ſtage.

REPOSITORY, a ſtone houſe, or place in which things are laid up, and preſerved. In this ſenſe we ſay, the repoſitory of the royal ſociety. See MUSEUM.

REPRESENTATION, in the drama, the exhibition of a theatrical piece, together with the ſcenes, machines, &c.

REPRESENTATIVE, one who perſonates or ſupplies the place of another, and is inveſted with his right and authority. Thus the houſe of commons are the repreſentatives of the people in parliament. See PARLIAMENT.

REPRIEVE, or REPRIVE, in law, is ſuſpending or deferring the execution of the law upon a priſoner for a certain time; or a warrant from the king for deferring the execution of a perſon condemned.

Every judge, who has the power of paſſing ſentence on criminals, has alſo the power to reprieve them: but in London, no perſon convicted of felony can be reprieved without the king's warrant. However, where a woman is condemned for treaſon or felony, and, upon pleading her belly, is found to be quick with child, execution is of courſe reſpited, and the woman becomes reprieved till her delivery: but this favour can only be granted once. The execution of offenders is frequently ſtayed by reprieve, upon condition of tranſportation.

REPRISALS, a right which princes claim of taking from their enemies any thing equivalent to what they unjuſtly detain from them.

Repriſals is alſo uſed for a letter of marque granted by a prince to his ſubject. See the article MARQUE.

REPRISE, or REPRIZE, at ſea, is a merchant-ſhip which, after its being taken by a corſair, privateer, or other enemy, is retaken by the oppoſite party.

If a veſſel thus retaken has been twenty-four hours in the poſſeſſion of the enemy, it is deemed a lawful prize; but if it be retaken within that time, it is to be reſtored to the proprietor, with every thing therein, upon his allowing one third to the veſſel who made the repriſe. Alſo if the repriſe has been abandoned by the enemy, either in a tempeſt or from any other cauſe, before it has been led into any port, it is to be reſtored to the proprietor.

REPRIZES, in law, are deductions or payments annually made out of a manor or lands; as rent-charges, penſions, annuities, &c.

REPROBATION, in theology, a decree by which God is ſuppoſed either from all eternity, or from the creation of the world, to conſign over to eternal miſery the greateſt part of mankind, and to ſave none of the human race, except thoſe whom he made the heirs of glory by election.

Caſuiſts diſtinguiſh two kinds of reprobation, poſitive and negative. Poſitive reprobation, is that by which God is ſuppoſed to create men with a poſitive and abſolute reſolution to damn them eternally: and negative reprobation, is that whereby God, though he creates all men with a ſincere deſire to ſave them, and furniſhes them with all the neceſſary, means of ſalvation, ſo that all may be ſaved that will; yet ſees there are ſeveral who will not do it, with the aids he ſhall afford them, and ſees at the ſame time, they would do it with certain other aids, which he ſees, but will not give them.

REPRODUCTION, the act whereby a thing is produced anew, or grows a ſecond time.

The reproduction of ſeveral parts of lobſters, crabs, &c. is one of the greateſt curioſities in natural hiſtory. It ſeems, indeed, inconſiſtent with the modern ſyſtem of generation, which ſuppoſes the animal

animal to be wholly formed in the egg; that, in lieu of an organical part of an animal cut off, another ſhould ariſe perfectly like it: the fact, however, is too well atteſted to be denied. The legs of lobſters, &c. conſiſt each of five articulations; now when any of the legs happen to break, by any accident, as by walking, &c. which frequently happens, the fracture is always found to be at the future near the fourth articulation; and what they thus loſe, is exactly reproduced in ſome time afterwards; that is, a part of the leg ſhoots out, conſiſting of four articulations, the firſt whereof has two claws, as before; ſo that the loſs is entirely repaired.

If the leg of a lobſter be broken off by deſign at the fourth or fifth articulation, what is thus broke off is always reproduced. But, if the fracture be made in the firſt, ſecond, or third articulation, the reproduction is not ſo certain. And it is very ſurprizing, that, if the fracture be made at theſe articulations, at the end of two or three days, all the other articulations are generally found broke off to the fourth, which, it is ſuppoſed, is done by the creature itſelf, to make the reproduction certain. The part reproduced is not only perfectly ſimilar to that retrenched, but alſo, in a certain ſpace of time, grows equal to it. Hence it is that we frequently ſee lobſters, which have their two large legs unequal, in all proportions. And, if the part reproduced be broken off, a ſecond will ſucceed.

REPTILES, in natural hiſtory, a kind of animals denominated from their creeping or advancing on the belly. Or reptiles are a genus of animals and inſects, which, inſtead of feet, reſt on one part of the body, while they advance forward with the reſt.

Such are earthworms, ſnakes, caterpillars, &c. Indeed, moſt of the claſs of reptiles have feet; only thoſe very ſmall, and the legs remarkably ſhort in proportion to the bulk of the body.

Naturaliſts obſerve a world of artful contrivance for the motion of reptiles. Thus, particularly in the earth-worm, Dr. Willis tells us, the whole body is only a chain of annular muſcles; or, as Mr. Derham ſays, it is only one continued ſpiral muſcle, the orbicular fibres whereof being contracted, render each ring narrower and longer than before; by which means it is enabled, like the worm of an augre, to bore its paſſage into the earth. Its reptile motion might alſo be explained by a wire wound on a cylinder, which when ſlipped off, and one end extended and held faſt, will bring the other near to it. So the earth-worm having ſhot out and extended his body (which is with a wreathing) it takes hold by theſe ſmall feet it hath, and ſo contracts the hinder part of its body. Dr. Tyſon adds, that when the forepart of the body is ſtretched out, and applied to a plane at a diſtance, the hind part relaxing and ſhortening is eaſily drawn towards it as a center.

Its feet are diſpoſed in a quadruple row the whole length of the worm, with which, as with ſo many hooks, it faſtens down ſometimes this and ſometimes that part of the body to the plane, and at the ſame time ſtretches out or drags after it another.

The creeping of ſerpents is effected after a ſomewhat different manner; there being a difference in their ſtructure, in that theſe laſt have a compages of bones articulated together.

The body here is not drawn together, but as it were complicated; part of it being applied on the rough ground, and the reſt ejaculated and ſhot from it, which, being ſet on the ground in its turn, brings the other after it. The ſpine of the back variouſly wreathed has the ſame effect in leaping, as the joints in the feet of other animals; they make their leaps by means of muſcles, and extend the plicæ or folds.

Reptile is alſo uſed, by ſome botanical writers, to ſignify plants which creep upon the earth, unleſs ſuſtained by ſome other plant, prop, &c. As cucumbers, melons, the vine, &c.

REPUBLIC, *reſpublica*, commonwealth, a popular ſtate or government; or a nation where the people have the government in their own hands.

Republic *of letters*, a phraſe uſed collectively of the whole body of the people of ſtudy and learning.

REPUDIATION, *repudium*, in the civil law, the act of divorcing. See Divorce.

REPULSION, *repulſio*, in phyſics, that property in bodies, whereby, if they are placed juſt beyond the ſphere of each other's attraction of coheſion, they mutually fly from each other.

Thus if an oily ſubſtance, lighter than water, be placed on the ſurface thereof, or if a piece of iron be laid upon mer-

tury, the surface of the fluid will be depressed about the body laid on it: this depression is manifestly occasioned by a repelling power in the bodies, which hinders the approach of the fluid towards them. But it is possible, in some cases, to press or force the repelling bodies into the sphere of one another's attraction; and then they will mutually tend toward each other, as when we mix oil and water till they incorporate.

Dr. Knight defines repulsion to be that cause which makes bodies mutually endeavour to recede from each other, with different forces, at different times; and that such a cause exists in nature, he thinks evident for the following reasons, 1. Because all bodies are electrical, or capable of being made so; and it is well known, that electrical bodies both attract and repel. 2. Both attraction and repulsion are very conspicuous in all magnetical bodies. 3. Sir Isaac Newton has shewn from experiments, that the surfaces of two convex glasses repel each other. 4. The same great philosopher has explained the elasticity of the air, by supposing its particles mutually to repel each other. 5. The particles of light are, in part at least, repelled from the surfaces of all bodies. 6. Lastly, it seems highly probable, that the particles of light mutually repel each other, as well as the particles of air.

The same gentleman ascribes the cause of repulsion, as well as that of attraction, to the immediate effect of God's will; and as attraction and repulsion are contraries, and consequently cannot, at the same time, belong to the same substance, the doctor supposes there are in nature two kinds of matter, one attracting, the other repelling; and that those particles of matter which repell each other, are subject to the general law of attraction in respect of other matter. A repellent matter being thus supposed, equally dispersed through the whole universe, the doctor attempts to account for many natural phænomena by means thereof. He thinks light is nothing but this repellent matter put into violent vibrations, by the repellent corpuscles which compose the atmosphere of the sun and stars; and that, therefore, we have no reason to believe they are gulphs of fire, but, like the rest of the heavenly bodies, inhabitable worlds. From the same principles, he attempts to explain the nature of fire and heat, the various phænomena of the magnet, and the cause of the variation of the needle: and, indeed, it is difficult, if not impossible, by the doctrine of attraction alone, to account for all the phænomena observable in experiments made with magnets, which may now be solved by admitting this doctrine of a repellent fluid; but whether it will be sufficient to account for all the particular phænomena of nature, which are the proper tests of an hypothesis, time and experience alone must determine.

The doctor also endeavours to shew, that the attractions of cohesion, gravity and magnetism are the same, and that by these two active principles, *viz.* attraction and repulsion, all the phænomena of nature may be explained; but as his ingenious treatise on this subject is laid down in a series of propositions, all connected together, it would be impossible to do justice to his arguments, without transcribing the whole: we shall therefore refer the curious to the book itself.

According to 'sGravesande and others, when light is reflected from a polished spherical surface, the particles of light do not strike upon the solid parts, and so rebound from them; but are repelled from the surface, at a small distance before they touch it, by a power extended all over the said polished surface. And Sir Isaac Newton observes, that the rays of light are also expelled by the edges of bodies, as they pass near them; so as to make their shadows, in some cases, larger than they would otherwise be. See 'sGravesande's Introd. P. I. n° 40 to 44. and Sir Isaac Newton's Optics, B. II. P. III. prop. 8. and B. III. P. I. where this repulsive force is illustrated from other phænomena.

REQUENA, a town of New Castile, forty-five miles west of Valencia.

REQUEST, in law, a supplication or petition preferred to a prince, or to a court of justice; begging relief in some conscionable cases where the common law grants no immediate redress.

*Court of* REQUESTS, an antient court of equity, instituted about the nineteenth year of Henry VII. See COURT.

In the fortieth and forty-first years of queen Elizabeth, it was adjudged upon solemn argument, in the court of common-pleas, that the court of request was then no court of equity.

REQUIEM, in the romish church, a mass sung for the rest of the soul of a person deceased. See the article MASS.

RESARCELE'E, in heraldry, is where a ſlender croſs is charged upon another, as repreſented in plate CCXXXI. fig. 4.

RESCEIT, *receptio*, in law, an admiſſion or receiving of a third perſon to plead his right, in a cauſe formerly commenced between the other two.

RESCHET, the capital of the province of Gilan, in Perſia, ſituated on the ſouth-weſt coaſt of the Caſpian ſea.

RESCISSION, *reſciſſio*, in the civil law, an action intended for the annulling, or ſetting aſide, any contract, deed, *&c.*

RESCOUS, or RESCUE, in law, an illegal taking away and ſetting at liberty a diſtreſs taken, or a perſon arreſted, by proceſs, or courſe of law. See the article DISTRESS, *&c.*

Reſcous, in matters relating to treaſon, is deemed treaſon; and in matters concerning felony, is felony.

RESCRIPT, *reſcriptum*, an anſwer delivered by an emperor, or a pope, when conſulted by particular perſons, on ſome difficult queſtion, or point of law; to ſerve as a deciſion thereof.

RESEARCH, a ſcrutiny, or diligent enquiry into any thing.

RESEARCH, in muſic, is a kind of prelude or voluntary played on the organ, *&c.* wherein the performer ſeems to ſearch or look out for the ſtrains and touches of harmony, which he is to uſe in the regular piece to be played afterwards. See the article PRELUDE.

RESEARCHING, in ſculpture, the repairing of a caſt figure, *&c.* with proper tools; or the finiſhing it with art and exactneſs, ſo as the minuteſt parts may be well defined.

RESEDA, BASE-ROCKET, in botany, a genus of polyandria-trigynia claſs of plants, the corolla of which conſiſts of certain unequal petals, ſome one of which is always ſemitrifid; and its fruit is a gibboſe and angulated capſule, containing one cell, with numerous kidney-ſhaped ſeeds.

RESERVATION, in law an action or clauſe whereby ſomething is reſerved, or ſecured to one's ſelf.

*Mental* RESERVATION, a propoſition which ſtrictly taken, and according to the natural import of the terms, is falſe; but, if qualified by ſomething concealed in the mind, becomes true.

Mental reſervations are the great refuge of religious hypocrites, who uſe them to accommodate their conſciences with their intereſts: the jeſuits are zealous advocates for mental reſervations; yet are they real lyes, as including an intention to deceive.

RESERVE, in law, the ſame with reſervation. See the article RESERVATION.

*Body of* RESERVE, or *corps de* RESERVE, in military affairs, the third or laſt line of an army, drawn up for battle; ſo called becauſe they are reſerved to ſuſtain the reſt, as occaſion requires; and not to engage, but in caſe of neceſſity.

RESERVOIR, a place where water is collected and reſerved, in order to be conveyed to diſtant places through pipes, or ſupply a fountain, or jet d'eau.

RESET, in law, the receiving or harbouring an outlawed perſon. See the article OUTLAWRY.

RESIDENCE, in the canon and common law, the abode of a perſon, or incumbent, upon his benefice; and his aſſiduity in attending on the ſame.

RESIDENT, a public miniſter, who manages the affairs of a kingdom or ſtate, at a foreign court.

They are a claſs of public miniſters inferior to ambaſſadors or envoys; but, like them, are under the protection of the law of nations.

RESIDENTIARY, *reſidentiarius*, a canon inſtalled into the privileges and profits of reſidence.

RESIDUAL FIGURE, in geometry, the figure remaining after ſubtracting a leſſer from a greater.

RESIDUAL ROOT, in algebra, a root compoſed of two parts or members, connected together by the ſign —.

Thus $x-y$ is a reſidual root, ſo called, becauſe its value is no more than the difference between its parts $x$ and $y$.

RESIDUE, *reſiduum*, the remainder or balance of an account, debt, or obligation.

RESIGNATION, in the canon law, the ſurrendering a benefice into the hands of the collator, or biſhop.

RESIGNEE, in law, the perſon to whom a thing is reſigned.

RESIN, in natural hiſtory, a viſcid juice ouzing either ſpontaneouſly, or by inciſion, from ſeveral trees, as the pine, fir, *&c.*

For the difference between reſins and gums, ſee the article GUM.

Natural reſins are either ſolid or fluid. Of the ſolid reſins, ſome are uſed more frequently in medicine, as ſtorax, benjamin, maſtich, olibanum, elmi, lac, dragons-blood, and camphor; and others more rarely, as anime, copal, caranna, tachamahaca, laudanum, ſandarach, *&c.* See

See the articles STORAX, BENJAMIN, &c.

The liquid raiſins, uſed in medicine, are leſs numerous, *viz.* balſam of gilead, of peru, of tolu, of capivi, turpentine, liquid amber, and liquid ſtorax. See the articles BALSAM, TURPENTINE, &c.

All reſins are uſed, more or leſs, in all officinal plaſters; both as being ripeners and drawers, and becauſe they give a due conſiſtence and tenacity.

The reſins of vegetables may be prepared nearly in the ſame manner as extracts, by uſing rectified ſpirit of wine inſtead of water: for ſuch a ſpirit is the only proper menſtruum that will diſſolve the groſſer reſinous matter of vegetables, as water is of the mucilaginous and ſaline parts; yet theſe principles are ſo intimately combined in almoſt all plants, that whichever of theſe liquors is applied at firſt, it will take up a portion of what is directly ſoluble only in the other: hence ſundry vegetables, extremely reſinous, and whoſe virtues conſiſt chiefly in their reſin, afford nevertheleſs very uſeful extracts with water, though not equal to thoſe obtained by a prudent application of ſpirit. See EXTRACT.

The indiſſolubility of pure reſins in aqueous fluids, and their tenacious quality by which they ſtick to the coats of the inteſtines, occaſion gripes and other inconveniencies; ſo that it is not ſafe to give them alone: the better way of fitting them for internal uſe, is by triturating them with the teſtaceous powders, or with almonds, into the form of an emulſion; or by diſſolving them in ſpirit of wine, and mixing the ſolution with a proper quantity of ſyrup. Six or eight grains of the raiſin of jalap, or ſcammony, managed in this manner, prove powerfully cathartic without griping, or greatly diſordering the body.

For the preparation of the reſins, ſee the articles, JALAP, SCAMMONY, &c.

RESISTANCE, or RESISTING FORCE, in philoſophy, denotes, in general, any power which acts in an oppoſite direction to another, ſo as to deſtroy or diminiſh its effect.

Hence the force wherewith bodies, moving in fluid mediums, are impeded or retarded, is the reſiſtance of thoſe fluids. See the article FLUID.

Authors have eſtabliſhed it as a certain rule, that, whilſt the ſame body moves in the ſame medium, it is always reſiſted in the duplicate proportion of its velocity; that is, if the reſiſted body move in one part of its track, with three times the velocity with which it moved in ſome other part, then its reſiſtance to the greater velocity will be nine times the reſiſtance to the leſſer: if the velocity in one place be four times the velocity in another, the reſiſtance to the greater velocity will be ſixteen times the reſiſtance to the leſſer, and ſo on. This rule, though exceſſively erroneous, when taken in a general ſenſe, is yet undoubtedly very near the truth, when confined within certain limits.

In order to conceive the reſiſtance of fluids to a body moving in them, Mr. Robins diſtinguiſhes between thoſe fluids, which being compreſſed by ſome incumbent weight, perpetually cloſe up the ſpace deſerted by the body in motion, without permitting, for an inſtant, any vacuity to remain behind it; and thoſe fluids in which, they being not ſufficiently compreſſed, the ſpace left behind the moving body remains for ſome time empty. Theſe differences, in the reſiſting fluids, will occaſion very remarkable varieties in the laws of their reſiſtance, and are abſolutely neceſſary to be conſidered in the determination of the action of the air in ſhot and ſhells; for the air partakes of both theſe affections, according to the different velocities of the projected body.

If a fluid was ſo conſtituted that all the particles compoſing it were at ſome diſtance from each other, and there was no action between them, then the reſiſtance of a body moving therein, would be eaſily computed from the quantity of motion communicated to theſe particles: for inſtance, if a cylinder moved in ſuch a fluid in the direction of its axis, it would communicate to the particles it met with a velocity equal to its own, and in its own direction, ſuppoſing that neither the cylinder, nor the parts of the fluid were elaſtic; whence, if the velocity and diameter of the cylinder be known, and alſo the denſity of the fluid, there would thence be determined the quantity of motion communicated to the fluid, which (action and re-action being equal) is the ſame with the quantity loſt by the cylinder, conſequently the reſiſtance would be hereby aſcertained.

In this kind of diſcontinued fluid, the particles being detached from each other, every one of them can purſue its own motion in any direction, at leaſt for ſome time, independent of the neighbouring ones; wherefore, if inſtead of a cylinder

linder moving in the direction of its axis, a body, with a surface oblique to its direction, be supposed to move in such a fluid, the motion the parts of the fluid will hereby acquire, will not be in the direction of the resisted body, but perpendicular to its oblique surface; whence the resistance to such a body will not be estimated from the whole motion communicated to the particles of the fluid, but from that part of it only which is in the direction of the resisted body. In fluids then, where the parts are thus discontinued in each other, the different obliquities of that surface, which goes foremost, will occasion considerable changes in the resistance; although the section of the solid, by a plain perpendicular to its direction, should in all cases be the same. And Sir Isaac Newton has particularly determined, that in a fluid thus constituted, the resistance of a globe is but half the resistance of a cylinder of the same diameter, moving in the direction of its axis with the same velocity.

But though the hypothesis of a fluid, thus constituted, be of great use in explaining the nature of resistances; yet, in reality, no such fluid does exist within our knowledge: all the fluids with which we are conversant are so formed, that their particles either lie contiguous to each other, or at least act on each other in the same manner as if they did; consequently, in these fluids, no one particle, contiguous to the resisted body, can be moved, without moving at the same time a great number of others, some of which will be distant from it; and the motion thus communicated to a mass of the fluid will not be in any one determined direction, but will in each particle be different, according to the different manners in which it lies in contact with those, from which it receives its impulse; whence, great numbers of the particles, being diverted into oblique directions, the resistance of the moving body, which will depend on the quantity of motion communicated to the fluid in its own direction, will be hereby different in quantity, from what it would be in the preceding supposition, and its estimation becomes much more complicated and operose. Sir Isaac Newton, however, has determined, that the resistance to a cylinder, moving in the direction of its axis in such a compressed fluid as we have here treated of, is but one fourth part of the resistance, which the same cylinder would undergo, if it moved with the same velocity, in a fluid, constituted in the manner we have described in our first hypothesis, each fluid being supposed to be of the same density. But again, it is not only in the quantity of their resistance that these fluids differ, but likewise in the different manner in which they act on solids of different forms moving in them.

We have shewn, that in the discontinued fluid, which we first described, the obliquity of the foremost surface of the moving body would diminish the resistance; but in compressed fluids this holds not true, at least not in any considerable degree; for the principal resistance in compressed fluids arises from the greater or lesser facility, with which the fluid, impelled by the forepart of the body, can circulate towards its hindermost part; and this being little, if at all, affected by the form of the moving body, whether it be cylindrical, conical, or spherical, it follows, that while the transverse section of the body, and consequently the quantity of impelling fluid is the same, the change of figure in the body will scarcely affect the quantity of its resistance.

The resistance of bodies of different figures, moving in one and the same medium, has been considered by Mr. J. Bernouli in the Acta Lipsiens. for May, 1693; and the rules he lays down, on this subject are the following: 1. If an isosceles triangle be moved in the fluid according to the direction of a line which is normal to its base; first with the vertex foremost, and then with its base; the resistances will be as the legs, and as the square of the base, and as the sum of the legs. 2. The resistance of a square moved according to the direction of its side, and of its diagonal, is as the diagonal to the side. 3. The resistance of a circular segment (less than a semi-circle) carried in a direction perpendicular to its basis, when it goes with the base foremost, and when with its vertex foremost (the same direction and celerity continuing, which is all along supposed) is as the square of the diameter to the same, less one third of the square of the base of the segment. Cor. Hence the resistances of a semi-circle, when its base, and when its vertex go foremost, are to one another in a sesquialterate ratio. 4. A parabola moving in the direction of its axis, with its basis,

basis, and then its vertex foremost, has its resistances, as the tangent to an arch of a circle, whose diameter is equal to the parameter, and the tangent equal to half the basis of the parabola. 5. The resistances of an hyperbola, or the semi-ellipsis, when the base and when the vertex goe foremost, may be thus computed; let it be, as the sum, or difference, of the transverse axis, and latus rectum, is to the transverse axis, so is the square of the latus rectum to the square of the diameter of a certain circle; in which circle apply a tangent equal to half the basis of the hyperbola or ellipsis. Then say again, as the sum, or difference, of the axis and parameter is to the parameter, so is the aforesaid tangent to another right line. And further, as the sum, or difference, of the axis and parameter is to the axis, so is the circular arch, corresponding to the aforesaid tangent, to another arch. This done, the resistances will be as the tangent to the sum, or difference, of the right line thus found, and that arch last mentioned. 6. In general, the resistances of any figure whatsoever going now with its base foremost, and then with its vertex, are as the figures of the basis to the sum of all the cubes of the element of the basis divided by the squares of the element of the curve line.

All which rules, he thinks, may be of use in the fabric or construction of ships, and in perfecting the art of navigation universally. As also for determining the figures of the balls of pendulums for clocks. See the article SHIP, &c.

As to the resistance of the air, Mr. Robins, in his new principles of gunnery, took the following method to determine it: he charged a musket-barrel three times successively with a leaden ball $\frac{3}{4}$ of an inch diameter, and took such precaution in weighing of the powder, and placing it, as to be sure, by many previous trials, that the velocity of the ball could not differ by 20 feet in 1″ from its medium quantity. He then fired it against a pendulum, placed at 25, 75, and 125 feet distance, &c. from the mouth of the piece respectively. In the first case it impunged against the pendulem with a velocity of 1670 feet in 1″; in the second case with a velocity of 1550 feet in 1″; and in the third case with a velocity of 1425 feet in 1″; so that in passing through 50 feet of air, the bullet lost a velocity of about 120, or 125 feet in 1″; and the time of its passing through that space being about $\frac{1}{32}$ or $\frac{1}{30}$ of 1″, the medium quantity of resistance must, in these instances, have been about 120 times the weight of the ball; which as the ball was nearly $\frac{1}{12}$ of a pound, amounts to about 10 ℔. avoirdupoise.

Now if a computation be made, according to the method laid down for compressed fluids in the 38th Propos. of lib. 2. of Sir Isaac Newton's Principia, supposing the weight of water to be to the weight of air, as 850 to 1, it will be found that the resistance of a globe of three quarters of an inch diameter, moving with a velocity of about 1600 feet in 1″, will not, on those principles, amount to any more than a force of $4\frac{1}{6}$ ℔. avoirdupoise; whence we may conclude (as the rules in that proposition for slow motions are very accurate) that the resisting power of the air in slow motions is less than in swift motions, in the ratio of $4\frac{1}{6}$ to 10, a proportion between that of 1 to 2, and 1 to 3.

Again charging the same piece with equal quantities of powder, and balls of the same weight, and firing three times at the pendulum, placed at 25 feet distance from the mouth of the piece, the medium of the velocities with which the ball impinged was 1690 feet in 1″. Then removing the piece 175 feet from the pendulum, the velocity of the ball, at a medium of five shots, was 1300 feet in 1″. Whence the ball, in passing through 150 feet of air, lost a velocity of about 390 feet in 1″; and the resistance, computed from these numbers, comes out something more than in the preceding instance, amounting to between 11 and 12 pounds avoirdupoise: whence, according to these experiments, the resisting power of the air to swift motions is greater than in slow ones, in a ratio which approaches nearer to the ratio of 3 to 1, than in the preceding experiments.

Having thus ascertained the resistance to a velocity of near 1700 feet in 1″, he next proceeded to examine this resistance in smaller velocities: the pendulum being placed at 25 feet distance, was fired at five times, and the mean velocity with which the ball impinged was 1180 feet in 1″. Then removing the pendulum to the distance of 250 feet, the medium velocity of five shot at this distance, was 950 feet in 1″; whence the ball, in passing

sing through 225 feet of air, lost a velocity of 230 feet in 1″, and as it passed through that interval in about $\frac{3}{14}$ of 1″, the resistance to the middle velocity will come out to be near $33\frac{1}{2}$ times the gravity of the ball, or 2 lb. 10 oz. avoirdupoise. Now the resistance to the same velocity, according to the laws observed in slower motions, amounts to $\frac{7}{11}$ of the same quantity; whence in a velocity of 1065 feet in 1″, (the medium of 1180 and 950) the resisting power of the air is augmented in no greater proportion than of 11 to 7; whereas in greater degrees of velocity, as before, it amounted very near the ratio of 3 to 1.

That this resisting power of the air to swift motions, is very sensibly increased beyond what Sir Isaac's theory for slow motions makes it, seems hence to be evident. It being, as has been said, in musket, or cannon shot, with their full charge of powder, near three times the quantity assigned by that theory.

The resistance of a bullet of three quarters of an inch diameter, moving in air with a velocity of 1670 feet in 1″, amounting, as we said, to 10 lb. the resistance of a cannon ball of 24 lb. fired with its full charge of powder, and thereby moving with a velocity of 1650 feet in 1″, may hence be determined. For the velocity of the cannon ball being near the same as the musket bullet, and its surface above 54 times greater, it follows, that the resistance on the cannon ball will amount to more than 540 lb. which is near 23 times its own weight. And from hence it appears how rash and erroneous the opinion of those is, who neglect the consideration of the resistance of the air as of no importance in the doctrine of projectiles. See the articles Projectiles and Gunnery.

Resistance of the fibres of solid bodies is more properly called cohesion. See the article Cohesion.

*Solid of least* Resistance. See Solid.

RESOLUTION, in chemistry, &c. the reduction of a mixed body into its component parts, or first principles, by a proper analysis. See the articles Menstruum and Solution.

The resolution of bodies is effected by divers operations, as distillation, sublimation, fermentation, precipitation, &c. See the articles Distillation, Sublimation, &c.

Some logicians use the term resolution for what is more usually called analysis, or the analytic method. See the articles Analysis and Method.

Resolution, in medicine, that coction or alteration of the crude peccant matter of any disease, either by the natural strength of the patient, or of its own accord, or by the application of remedies, whereby its bulk, figure, cohesion, &c. are so far changed, as that it ceases to be morbid, and becomes laudable. This Boerhaave observes, is of all others the most perfect cure, where it is effected without any evacuation, as supposing the matter favourable, the constitution excellent, and the medicines good.

Resolution, in music, is when a canon or perptual fugue is not wrote on a line, or in one part, but all the voices that are to follow the guide or first voice are wrote separately either in score, that is in separate lines, or in separate parts, with the pauses each is to observe, and in the proper tone to each.

RESOLVENTS, *resolventia*, in medicine, remedies proper to resolve and dissipate tumors and gatherings, to soften indurations, and, by their tenuity and warmth, evacuate redundant and peccant humours through the pores. Under this class come various unguents, emplasters, &c.

RESONANCE, resounding, in music, &c. a sound returned by the air, inclosed in the bodies of stringed musical instruments, as lutes, &c. or even in the bodies of wind instruments, as flutes, &c. See Sound and Music.

Elliptic and parabolic vaults, resound strongly, that is, they will reflect or return a sound. The mouth and the parts thereof, as the palate, tongue, teeth, nose, and lips, Monsieur Dodart observes, contribute nothing to the tone of the voice, but their effect is very great as to the resonance: of this we have a very sensible instance in that vulgar instrument called a jews-harp, or trompe de Bearn; for if you hold it in your hand, and strike the tongue or spring thereof, which is the method practised to sound this instrument, it yields scarce any noise, but holding the body of it between the teeth, and striking it as before, it makes a musical buzz, which is heard at a good distance, and especially the lower notes.

So also in the haut-boys, the tune of the reed is always the same; being a sort of drone, the chief variety whereof is in the

the tune of resonance produced in the mouth, by the greater or less aperture, and the various motions of the lips.

RESORT, or RESSORT. See RESSORT.

RESPECTU COMPUTI VICECOMITIS HABENDO, in law, a writ directed to the treasurer and barons of the exchequer for the respiting of a sheriff's account.

RESPIRATION, *respiratio*, the act of respiring, or breathing the air. What respiration is, and why it is uninterruptedly carried on without the concurrence of the mind, will appear from the following considerations of Boerhaave. The lungs suspended in the air, which every where acts upon them, and equally presses them always, collapse, contract themselves into a smaller space, and become much less than when they remained in the intire thorax. This is principally performed by the contractile force of the muscular fibres, which connect the squamous segments of the bronchia. If the lungs thus contracted, are filled with air, forcibly blown through the glottis, they are so distended as in bulk not only to equal that which they had in the intire thorax, but even to exceed it; all which is sufficiently certain from experiments. The same thing happens if, when an access for the air through the glottis is left to the lungs, the air, externally acting on the lungs, is either removed, or its pressure diminished. Hence it is obvious, that the lungs, by their proper force have always a tendency to become less in all their parts than they are when placed in the intire thorax. For this reason, it is certain that they are in a continual state of distraction so long as a person is alive, so that they must collapse, and be diminished, whilst the whole of the animal remains in a vacuum, obtained by an exhaustion of the air in an air-pump. For there is nothing similar to a circumambient air between the external membrane of the lungs, and all the internal surface of the pleura in a sound person; nothing therefore externally compresses the lungs, except the diaphragm. There is, however, always an internal air contained in them, and freely conveyed to them through the glottis. Hence the lungs are always somewhat more distended by the internal, than they are compressed by the external, air, the access of which is hindered by the diaphragm, which is so connected with the ribs and vertebræ, that the air cannot enter the thorax in such a manner as would be requisite for an equilibrium. See the article LUNGS, DIAPHRAGM, &c.

Since, therefore, in inspiration, a greater quantity of air enters the lungs through the glottis, it will extend the lungs more, and overcome their natural force, so that in this action the lungs are passive; but how far they are active is only to be discovered from certain phænomena. In vital inspiration, then, especially considered in a sleeping person, first the ribs, particularly the nine superior ones, articulated at the vertebræ, and by cartilages joined to the sternum, with their arched part, rise to the clavicles, so that this motion is principally observed in the middle of the arch, whilst three, or perhaps four, inferior ribs are turned downwards, backwards, and obliquely outwards, but in such a manner that the seventh, eighth, ninth, and tenth ribs are by their cartilaginous segments, as it were, drawn inwards. Secondly, the whole abdomen, to the very end of inspiration, is gradually rendered more tumid and pressed downwards. Thirdly, at the same time the cavity of the thorax is enlarged, as is obvious from repeated experiments.

Whilst the parts remain in this situation, the air acts upon the lungs with a force equal to that with which the thorax resists, so that the lungs will remain in a state of rest. Hence less blood will pass through them, and a smaller quantity of it will be forced into the left ventricle of the heart, and consequently less blood will be conveyed to the cerebellum and its nerves. The arterial blood will also act less upon the intercostal muscles and diaphragm, so that the causes dilating the thorax are weakened. Hence the elasticity of the cartilaginous segments again depresses the ribs, in which work they are also assisted by the muscular fibres arising from the side of the sternum within the thorax, and inserted into the bony extremities, and cartilages of the true ribs. At the same time the distracted fibres of the peritonæum and abdominal muscles restore themselves. Hence the compressed viscera thrust the relaxed diaphragm upwards into the thorax, which is by this means contracted, and the air expelled from the lungs.

lungs. By this means, expiration and the action already mentioned, are performed. But in a particular manner by these two actions the blood is not only carried through the lungs, but its motion accelerated. See CIRCULATION, &c.

Physicians are not agreed about the use and effects of respiration; some think that the air is insinuated into the vessels of the lungs, to give a greater fluidity and motion to the blood; others, that it conveys very subtile nitrous corpuscles thereunto, which gives it the red colour; others again believe the air serves to condense the blood, which has been heated by circulation. This is certain, that the air entering into the lungs, and all the small ramifications which surround its vesicles is broke, comminuted, and rendered more fluid, and that it is deprived of a serosity, which proceeds from the lungs by perspiration in the form of a vapour that is visible in cold weather. It may be added, that the voice, laughter, coughing, sneezing, yawning, and sucking, depend upon respiration. Boerhaave takes the principal uses of respiration to be the further preparation of the chyle, its more accurate mixture with the blood, and its conversion into a nutritious juice, proper to repair the decays of the body. Other authors take a great use of respiration to be, by the neighbourhood of the cold nitrous air, to cool the blood coming reeking hot out of the right ventricle of the heart through the lungs, and to act as a refrigeratory; others assert one grand use of respiration to be the throwing off the fuliginous vapours of the blood, along with the expelled air; and for inspiration they assert, that it conveys a nitro-aerial ferment to the blood, to which the animal spirits, and all muscular motion, are owing. But Dr. Thurston rejects all these, as being the principal uses of respiration, and from the experiments of Dr. Croon, Dr. Hook, and others, made before the Royal Society, he shews the principal use of respiration to be that of moving, or passing the blood from the right to the left ventricle of the heart, and so to effect circulation; whence it is, that persons hanged, drowned, or strangled, so suddenly die, *viz.* because the circulation of the blood is stopped, and for the same reason it is, that animals die so speedily in the air-pump. This use of respiration Dr. Drake not only confirms, but carries farther, making it the true cause of the diastole of the heart, which neither Borelli, Dr. Lower, nor Mr. Cowper, had well accounted for. See the articles DIASTOLE and SYSTOLE.

From experiments made upon dogs, and other animals, Dr. Hales shews, that without respiration, the blood would soon turn putrid and pestilential; and indeed the only animal exempted from the necessity of respiration is a foetus. See the article FOETUS.

With regard to the force of respiration, the last mentioned author observes, that though a man by a peculiar action of his mouth and tongue, may suck mercury twenty-two inches, and some men twenty seven or twenty-eight, high, yet he found from experience, that by the bare inspiring action of the diaphragm and dilating thorax, he himself could scarcely raise the mercury two inches, at which time the diaphragm must act with a force equal to the weight of a cylinder of mercury, whose base is commensurate to the area of the diaphragm, and its height two inches, whereby the diaphragm must at the same time sustain a weight equal to many pounds; neither are its counteracting muscles, those of the abdomen, able to exert a greater force.

With regard to the quantity of moisture carried off by respiration, the Doctor, from an experiment on wood-ashes, estimates that quantity to be equal to seventeen grains in fifty expirations, whence there will proportionably be four hundred and eight grains evaporated or breathed off in twelve hundred expirations, being the number in an hour, and thence in twenty-four hours 9792 grains, or 1.39 pounds, which supposing the surface of the lungs to be 41635 square inches, then the quantity evaporated from that inward surface will be $\frac{1}{1074}$th part of an inch depth.

From the violent and fatal effects of very noxious vapours on the respiration and life of animals, the Doctor shews how the respiration is proportionably incommoded when the air is loaded with lesser degrees of vapours, which vapours do in some measure clog and lower the air's elasticity, which it best regains by having these vapours dispelled by the ventilating motion of the free open air, that is best rendered wholsome by the agitation of winds; thus what we call a close warm air, such as has been long confined in a room, without having the vapours

in it carried off by communicating with the open air, is apt to give us more or lefs uneafinefs in proportion to the quantity of vapours which are floating in it. And thus many of thofe who have weak lungs, but can breathe very well in the frefh country air, are greatly incommoded in their breathing, when they come into large cities where the air is full of fuligenous vapours; and even the moft robuft and healthy, in changing from a city to a country air, find an exhilerating pleafure arifing from a more free and kindly infpiration, whereby the lungs being lefs loaded with condenfing air and vapours, and thereby the veficles more dilated with a clearer and more elaftic air, a freer courfe is thereby given to the blood, and probably a purer air mixed with it. See the article AIR.

RESPITE, in law, *&c.* fignifies a delay, forbearance, or prolongation of time, granted any one, for the payment of a debt, or the like.

RESPONDENT SUPERIOR, in law, is a fuperior's anfwering for the infufficiency of an inferior. Thus, if the fheriffs of London are infufficient, the lord-mayor and commonalty muft anfwer for them, as the fheriffs fuperior.

Superior officers muft alfo anfwer for their deputies, in civil actions, in cafe they are infufficient to anfwer damages; as where a gaoler deputes another under him, and the perfon deputed fuffers an efcape, the gaoler muft anfwer for his deputy's infufficiency.

RESPONDENT, in the fchools, one who maintains a thefis, in any art or fcience; who is thus called, from his being to anfwer all the objections propofed by the opponent.

The refpondent is to fee whether the pofition made by the contrary party be juft and legitimate; or whether fome of the laws of oppofition be not broken. He is alfo to manage the modes and figures of the fyllogifms, to fee whether the premifes be juft; and through the whole, to anfwer rather by diftinguos, than by direct negation.

RESPONDENT, in law, a perfon who undertakes to anfwer for another; and alfo, one who binds himfelf as a fecurity for another perfon's good behaviour.

RESPONSALIS, in law, is a perfon who anfwers for another, in court, at a day affigned.

RESPONSARY SONG, an anthem, in which the chorifters fing by turns.

RESPONSE, an anfwer or reply. A word chiefly ufed in fpeaking of the anfwers made by the people to the prieft, in the litany, the pfalms, *&c.*

RESSAULT, in architecture, is the effect of a body which either projects or finks back; that is, ftands more out or in, than another, fo as to be out of the line or level with it.

RESSORT, or RESORT, a french word, fometimes ufed by englifh authors, to fignify the jurifdiction of a court, and particularly one from which there is no appeal.

Thus it is faid, that the houfe of lords judge en dernier reffort, or in the laft reffort.

RESSOURCE, a french word, ufed by englifh writers, to denote an after-game, for recovering a perfon's loffes, or fomething to apply back to, for fuccour.

REST, *quies*, the continuance of a body in the fame place, or its continual application or contiguity to the fame parts of the ambient or contiguous bodies; and, therefore, is oppofed to motion. See the article MOTION.

Sir Ifaac Newton defines true or abfolute reft, to be the continuance of a body in the fame part of abfolute fpace; and relative reft to be the continuance of a body in the fame part of relative fpace. See the article SPACE.

It is one of the laws of nature, that matter is indifferent to motion or reft, as has been fhewn under the article INERTIA.

Reft, confidered in a phyfical view, is only falutary, in fo far as it is duly proportioned to the exercife; for a fedentary idle life brings on many indifpofitions. See the article EXERCISE.

REST, in poetry, is a fhort paufe of the voice, in reading, being the fame with the cæfura, which, in alexandrian verfes, falls on the fixth fyllable; but in verfes of ten or eleven fyllables, on the fourth. See the articles CÆSURA, ALEXANDRIAN, *&c.*

REST, in mufic, the fame with paufe. See the article PAUSE.

RESTAURATION, the act of re-eftablifhing or fettling a thing in its former good ftate.

RESTAURATION, in architecture, the act of repairing thofe parts of a building that are gone to decay, in fuch a manner as to give it its original ftrength and beauty.

From the plinths of the corinthian columns of the Pantheon, which are almoft wholly

wholly under ground, it is evident that the pavement of this temple is only a reſtauration made in the time of Septimus Severus.

RESTAURATION, in ſculpture, is the repairing a mutilated ſtatue, *&c.*

Many of the antique ſtatues have undergone a reſtauration; as the wreſtlers, in the gallery of the great duke of Florence; the farneſe Hercules; the Faunus in the villa Borgheſe, at Rome; and the Venus of Arles, in the gallery at Verſailles: but theſe reſtaurations have all been made by the ableſt ſculptors.

RESTINCTION, in chemiſtry, is the quenching a metal or mineral, in ſome liquor, in order either to correct or exalt it, by giving it ſome new power or quality.

RESTITUTION, in phyſics, is reſtoring an elaſtic body, forcibly bent, to its natural ſtate. See the article ELASTICITY.

RESTITUTION, in a moral and legal ſenſe, is reſtoring a perſon to his right; or returning ſomething unjuſtly taken or detained from him.

In the romiſh church, uſurers, *&c.* are obliged to a reſtitution of their ill-gotten goods; otherwiſe the prieſt has no authority to give them abſolution.

RESTITUTION IN INTEGRUM, the ſame with reſciſſion. See RESCISSION.

RESTITUTION *of medals*, or RESTITUTED MEDALS, is a term uſed by antiquaries, for ſuch medals as were ſtruck by the emperors, to retrieve the memory of their predeceſſors.

Hence, in ſeveral medals we find the letters REST. This practice was firſt begun by Claudius, by his ſtriking afreſh ſeveral medals of Auguſtus. Nero did the ſame; and Titus, after his father's example, ſtruck reſtitutions of moſt of his predeceſſors. Gallienus ſtruck a general reſtitution of all the preceding emperors, on two medals, the one bearing an altar, the other an eagle, without the REST. See the article MEDAL.

RESTITUTIONE TEMPORALIUM, is a writ that lies when a man is elected and confirmed biſhop of a dioceſe, for the recovery of the temporalities of the biſhopric.

This writ is directed from the king to the eſcheator, or rather ſheriff of the county.

RESTIVE, or RESTY, in the manege, a ſtubborn, unruly, ill-broken horſe, that ſtops, or runs back, inſtead of advancing forward.

RESTORATION, the ſame with reſtauration. See RESTAURATION.

In England, the return of king Charles II. in 1660, is, by way of eminence, called the Reſtoration; and the 29th of May is kept as an aniverſary feſtival, in commemoration of that event, by which the regal and epiſcopal government was reſtored.

RESTORATIVE, in medicine, a remedy proper for reſtoring and retrieving the ſtrength and vigour both of the body and animal ſpirits.

All under this claſs, ſays Quincy, are rather nutrimental than medicinal; and are more adminiſtered to repair the waſtes of the conſtitution, than to alter and rectify its diſorders. Whatſoever can anſwer this end, muſt be both endued with a diſpoſition to enter into, and mix with, the moſt ſubtile of the animal fluids, and to fall into and adhere with ſuch interſtices of the ſolids, as have been wore away by action, and ſtand in need of recruit. Theſe are one of the claſſes of balſamics, and are diſtinguiſhed by the term analeptics. See the articles ANALEPTICS, BALSAMICS, *&c.*

Some of the principal medicines of this intention are the leaves of white and black maiden-hair, eruca, colts-foot, piſtachio-nuts, ſcabious, balſam of Tolu, bdellium, benzoin, eryngo, ſtorax, barley, *&c.*

Hoffman obſerves, that a true and genuine reſtoration of the natural ſtrength depends upon proper aliments, both of the eatable and drinkable kind, being converted into good blood, and laudable juices, which afterwards generate that ſubtil fluid which is ſecreted in the brain; and being carried through the nerves to the muſcles and muſcular coats, principally ſupplies the body, and its ſeveral parts, with ſtrength and vigour. Thoſe nutritives, therefore, which afford a matter moſt proper for this purpoſe, are the beſt analeptics; of which kind are glutinous broths of fleſh, capons, and bones with their marrow, boiled in a cloſe veſſel, with water, a little wine, ſome ſlices of lemon, a little ſalt, powder of mace and cloves; broths alſo made of coarſe weſtphalian bread, water, wine, and eggs; chocolate, with or without milk, aſſes milk, *&c.* But thoſe nutritive and ſtrengthening aliments, he adds, are not to be uſed in the very time of the diſeaſe, nor when the whole maſs of blood and humours are impure; but when the diſtemper is over, and where, by a preced-

ing diſeaſe, or by long watching, fatigue, and labour of body, or large hæmorrhages, the ſtrength is waſted and impaired: but even then a proper moderation is to be obſerved and kept up to, becauſe theſe aliments paſs very ſpeedily into the blood, and augment its quantity.

RESTRICTION, among logicians, is limiting a term, ſo as to make it ſignify leſs than it uſually does.

RESTRINGENT, in medicine, the ſame with aſtringent. See ASTRINGENTS.

RESULT, what is gathered from a conference, inquiry, meditation, or the like; or the concluſion and effect thereof.

RESUMMONS, in law, is the ſecond ſummons or calling of a perſon to anſwer an action, where the firſt ſummons is defeated by any accident, as the death of a party, or the like.

RESUMPTION, a word uſed in various ſenſes: thus, in law, it ſignifies the king's taking again into his own hands, ſuch lands, *&c.* as he had before, on falſe ſuggeſtions, granted to a perſon by letters patent.

In the ſchools, reſumption ſignifies a ſummary repetition of an argument, in order to confute it.

The ſame word is alſo uſed by logicians for the reduction either of ſome figurative or quaint propoſition, to one more plain or intelligible; as, the meadows ſmile; that is, look pleaſant.

RESURRECTION, in theology, riſing again from the dead; or a perſon's returning to a ſecond life, with new bodily organs, adapted to the ſtate of its new exiſtence.

One of the greateſt arguments for the truth of chriſtianity is drawn from the reſurrection of our Saviour; the circumſtances of which are handed down to us in ſo plain and diſtinct a manner, by the evangeliſts, as make the evidence of this important truth amount to a demonſtration.

Chriſtians generally believe, that at the day of judgment, the very identical body they have now, with the ſame fleſh, blood, and bones, will be raiſed from the dead. But, in oppoſition to this opinion, many texts of ſcripture have been urged, particularly the account given of this important event by St. Paul; beſides ſeveral philoſophical objections, the principal of which are theſe.

That the ſame ſubſtance may happen to be a part of two or more bodies: thus a fiſh feeding on a man, and another man afterwards feeding on the fiſh, part of the body of the firſt man becomes incorporated with the fiſh, and afterwards with the body of the laſt man. Again, inſtances have been known of one man's immediately feeding on the body of another; and among the cannibals in the Weſt-Indies, who devour their enemies, the practice is frequent. Now it is alledged, where the ſubſtance of one is thus converted into the ſubſtance of another, each cannot ariſe with his whole body; to which then ſhall the common part be alloted?

To this objection ſome anſwer, that as all matter is not capable of being aſſimilated to the body, and incorporated with it, human fleſh may very probably be of this kind; and, therefore, what is thus eaten, may be again excreted and carried off.

But Mr. Leibnitz obſerves, that all that is eſſential to the body, is the original ſtamen, which exiſted in the ſemen of the father: this may be conceived as the moſt minute point imaginable, and therefore not to be ſeparated, nor any part of it united to the ſtamen of any other man. That all this bulk we ſee in the body, is only an accretion to this original ſtamen; and therefore there is no reciprocation of the proper matter of the human body.

Another objection is, that we know, by the late diſcoveries in the animal œconomy, that the human body is continually changing, and that a man has not entirely the ſame body to-day, as he had yeſterday; and it is even computed that in leſs than ſeven years time, the whole body undergoes a change. Which of thoſe many bodies then, which the ſame perſon has in the courſe of his life, is it that ſhall riſe? or does all the matter that has ever belonged to him, riſe again? or does only ſome particular ſyſtem thereof? the body, for example, he had at twenty, at forty, or at ſixty years old? If only this or that body ariſe, how ſhall it be rewarded or puniſhed for what was done by the other? and with what juſtice does one perſon ſuffer for another?

To this it has been anſwered, on the principles of Leibnitz, that notwithſtanding theſe ſucceſſive changes, this ſtamen, which is the only eſſential part of the body, has always remained the ſame; and that on Mr. Locke's principles, perſonal identity, or the ſameneſs of a rational being, conſiſts in ſelf-conſciouſneſs, in

in the power of confidering itfelf the fame thing in different times and places. By this, every one is to himfelf what he calls felf; without confidering whether that felf be continued in the fame, or in feveral fubftances. It is the fame felf now, it was then; and it was by the fame felf which now reflects on an action, that action was performed. Now it is this perfonal identity that is the object of rewards and punifhments, which, it is obferved may exift in different fucceffions of matter; fo that to render the rewards and punifhments juft and pertinent, we need only to rife again with fuch a body as that we retain the confcioufnefs of our paft actions.

RESUSCITATION, the fame with refurrection and revivification. See the preceding article.

The term refufcitation, however, is more particularly ufed by chemifts, for the reproducing a mixed body from its afhes; an art to which many have pretended, as to reproduce plants, &c. from their afhes.

RETAIL, in commerce, is the felling of goods in fmall parcels, in oppofition to wholefale. See the article COMMERCE.

RETAINER, in law, a fervant who does not continually dwell in the houfe of his mafter, but only attends upon fpecial occafions.

RETAINING FEE, the firft fee given to a ferjeant or counfellor at law, in order to make him fure, and prevent his pleading on the contrary fide. See FEE.

RETALIATION, among civilians, the act of returning like for like. See the article TALIO.

RETARDATION, in phyfics, the act of diminifhing the velocity of a moving body. See the article MOTION.

If bodies of equal bulk, but of different denfities, be moved through the fame refifting medium, with equal velocity, the medium will act equally on each, fo that they will have equal refiftances, but their motions will be unequally retarded, in proportion to their denfities. See the article RESISTANCE.

Retarded motion from gravity, is peculiar to bodies projected upwards, and this in the fame manner as a falling body is accelerated; only in the latter, the force of gravity acts in the fame direction with the motion of the body; and in the former in an oppofite direction. See the article ACCELERATION.

As it is the fame force which augments the motion in the falling, and diminifhes it in the rifing body, a body will rife till it has loft all its motion; which it does in the fame time wherein a body falling would have acquired a velocity equal to that wherewith the body was projected upwards.

RETE MIRABILE, in anatomy, a fmall plexus, or net-work of veffels in the brain, furrounding the pituitary gland. The rete mirabile is very confpicuous in brutes, but either not exiftent in man, or fo very minute that its exiftence is fairly doubted. See the article BRAIN.

RETENTION, is defined, by Mr. Locke, to be a faculty of the mind, whereby it keeps, or retains, thofe fimple ideas it has once received, by fenfation or reflection.

This is done two ways; firft, by keeping the idea which is brought into the mind for fome time in view; this is called contemplation. See the article CONTEMPLATION.

Secondly, by reviving thofe ideas in our minds which have difappeared, and have been as it were laid out of fight; this is memory, which is as it were the repofitory of our ideas. See MEMORY.

RETENTION is alfo ufed, in medicine, &c. for the ftate of contraction in the folids or vafcular parts of the body, which makes them hold faft their proper contents. In this fenfe retention is oppofed to evacuation and excretion. See the articles EVACUATION and EXCRETION.

Retention and excretion make two of the non-naturals.

Retention is alfo frequently confidered as a diforder, and defined to be the act of retaining the excrements, humours, &c. fo as they cannot be voided out of the body. See the article COSTIVENESS.

For the retention of the urine, fee the articles DYSURY, ISCHURY, and STRANGURY.

RETIARII, in antiquity, a kind of gladiators, thus denominated from a net which they made ufe of againft their antagonifts, who were called fecutores, and fometimes mirmillones. See the article GLADIATOR.

This net they carried under their buckler, and when opportunity ferved, caft it over the head of their antagonift, and in this condition killed him with a trident which they bore in the other hand.

RETICENCY, *reticentia*, a figure in rhetoric whereby we make oblique mention of a thing, in pretending to pafs it over unmentioned.

RET-

RETFORD, a borough-town of Nottinghamſhire, ſituated twenty-five miles north of Nottingham.

It ſends two members to parliament.

RETICULA, or RETICULE, in aſtronomy a contrivance for the exact meaſuring the quantity of eclipſes.

The reticule is a little frame, conſiſting of thirteen fine ſilken threads, equidiſtant from each other, and parallel, placed in the focus of object-glaſſes of teleſcopes; that is, in the place where the image of the luminary is painted in its full extent: of conſequence, therefore, the diameter of the ſun or moon is hereby ſeen divided into twelve equal parts or digits; ſo that to find the quantity of the eclipſe, there is nothing to do but to number the luminous and the dark parts. As a ſquare riticule is only proper for the diameter, not for the circumference, of the luminary, it is ſometimes made circular by drawing ſix-concentric equi-diſtant circles. This repreſents the phaſes of the eclipſe perfectly.

RETICULAR BODY, *corpus reticulare*, in anatomy, a very fine membrane, perforated, in the manner of a net, with a multitude of foramina. It is placed immediately under the cuticle, and when that is ſeparated from the cutis, whether by art or by accident, this adheres firmly to it, and is ſcarce poſſible to be parted from it, ſeeming rather to be its inner ſuperficies than a diſtinct ſubſtance. In regard to this, we are to obſerve, firſt, the places in which it is found, being all thoſe in which the ſenſe of feeling is moſt acute, as in the palms of the hands, the extremities of the fingers, and on the ſoles of the feet. The tongue, however, is the part where it is moſt accurately to be obſerved: it is more eaſily diſtinguiſhable there than any where elſe, and its nature and ſtructure are moſt evidently ſeen there.

Its colour in the Europeans is white, but in the Negroes, and other black nations, it is black; in the tawny it is yellowiſh: the ſkin itſelf in both is white; and the blackneſs and yellowneſs depend altogether on the colour of this membrane.

The uſes of the corpus reticulare are to preſerve the ſtructure of the other parts of the integuments, and keep them in their determinate form and ſituation. Its apertures give paſſage to the hairs, and let through the papillæ and excretory ducts of the ſkin: it retains theſe in a certain and determinate order, that they cannot be removed out of their places, and has ſome ſhare in preſerving the ſoftneſs of the papillæ, which renders them fit for the ſenſe of feeling. See the articles CUTICLE and CUTIS.

RETICULAR PLEXUS, *plexus reticularis*, ſometimes denotes the choroides, which is thus called becauſe its fibres are interwoven like a net. See CHOROIDES.

RETICULUM, the caul or omentum, a name ſometimes given to this part, from its net-like ſtructure. See OMENTUM.

RETIFORMIS LACIS, in anatomy, the ſame with the rete mirabile. See the article RETE MIRABILE.

RETINA, in anatomy, the expanſion of the optic nerve on the internal ſurface of the eye, whereupon the images of objects being painted, are impreſſed, and by that means conveyed to the common ſenſory in the brain, where the mind views and contemplates their ideas. See the article EYE.

*Diſeaſes of the* RETINA. The retina is liable to two ſorts of diſeaſes; the firſt is a ſeparation of ſome parts of this membrane from the choroides. At the place where this ſeparation is made, there follows an elevation or fold which ſtops the light, and hinders its paſſage to that part of the choroides which is covered by this fold: this occaſions a ſort of ſhade which the patients ſee in the air. The ſecond diſeaſe of the retina is an atrophy, or waſting of that membrane.

The cauſe of the firſt diſeaſe may be accounted for, from the blood-veſſels of the retina's turning varicous; for it is eaſily conceived that the dilatation of theſe veſſels may ſeparate the retina from the choroides, in that part which anſwers to the dilated veſſels. This diſeaſe is obſerved to proceed from a cold in the head after ſome violent exerciſe, or whatever elſe may have put the blood in a violent motion. Its ſigns are certain appearances in the air, more or leſs diſtant from the patient's eye, being a kind of ſhadows of different figures, modified according to the ſize and form of the parts of the retina, which are ſeparated. A further account of this diſeaſe, and the manner of treating it, may be ſeen in *Atoms and flies appearing before the* EYES, under the article EYE.

In an atrophy of the retina, as the rays of light are not ſufficiently modified in that membrane, they make too vivid an impreſſion on the choroides, which is very detrimental to it. Hence enſues a confuſed

confused vision, so that the patients at the first look can see very well; but if they continue to read any time, or to look at a shining object, they feel a certain weariness in their head and a dimness in their sight, which obliges them to close their eyes; then opening them a moment after they see as at their first look, but for a very short time.

Embroiderers, stocking-weavers, and shoe-makers, are subject to this disease; the first because the brightness of the gold, silver, and other colours, damages, the sight by the lively impression it makes on the eye; and the shoe-makers, in order to find the hole made by the awl, to run the end through it. By this continual attention, they fatigue and weaken their sight. No remedies cure this disease; nothing avails but rest, and little exercise of the sight.

RETINUE, *retinentia*, the attendants or followers of a prince or person of quality, chiefly in a journey.

In law, these persons are properly said to be a nobleman's retinue, who belong to him in quality either of servants or retainers.

RETIRADE, in fortification, a kind of retrenchment made in the body of a bastion, or other work, which is to be disputed, inch by inch, after the defences are dismantled. It usually consists of two faces, which make a re-entering angle. When a breach is made in a bastion, the enemy may also make a retirade or new fortification behind it.

RETLINGEN, an imperial city of Germany, in the circle of Swabia and dutchy of Wirtemberg, situated in east long. 9°, north lat. 48° 18′.

RETORT, in chemistry, a kind of hollow spherical vessel, ABCDEF (plate CCXXXII. fig. 1. n° 1, 2, 3.) ending in a cylindrical neck, whose upper horizontal line, AF, is a tangent of the sphere in its upper apex, A, whilst the lower line of the neck, DE, is a diameter of the same sphere, parallel to that tangent, whence such a retort easily determines the rising volatile particles into the cylindrical neck of the receiver, after being somewhat confined and beat back by the arched part of the vessel. This kind of retort is adapted to the separation of very fixed parts from those that are quite fixed, as we see in the distillation of oil of vitriol, spirit of nitre, spirit of salt, &c. The glass-men commonly bend the neck of the retort downwards, and draw it into a conical figure, open at the ends, in order that the vapours rising in the widest part of the neck may thus spontaneously fall downwards, condense, and distil into the receiver, which shews us the reason of the common form of the retort.

But in low distillations, where the strongest fire is for a long time required to raise ponderous particles, Boerhaave recommends the use of a cylindrical vessel, ABCD, n° 4. placed horizontally, with its upper horizontal part opening into an horizontal neck, by means whereof the distillation of phosphorus, and other bodies which rise with difficulty, is commodiously performed: and when he prepared large quantities of oil of vitriol, or other fossile acids, instead of retorts he used cylindrical earthen bodies, or long necks, as ABCDEFGH, (*ibid.* n° 5.) with wide cylindrical mouths, which he found to be an advantageous way of distilling the mineral acids; for by inserting hollow cylinders, as IKLM, (n° 6.) into the mouths of these vessels, and applying large glass receivers, as ONPQ, n° 7. horizontally to the other ends, and luting the junctures, he thus distilled with safety.

RETRACTION, *retractio*, the act of drawing back, or unsaying what a person had said before.

Among anatomists, retraction frequently signifies the contraction or shortening of any part.

RETRACTS, among horsemen, pricks in a horse's feet, arising from the fault of the farrier in driving nails that are weak, or in driving them ill pointed, or otherwise amiss. These, unless timely prevented, fester and prove very dangerous. When the farrier, in shoeing, perceives the horse to shrink at every blow on the nail, it is the sign of a retract, and the nail is to be pulled out again, which is done without any harm. When the horse halts immediately after he is shod, it is concluded some of the nails press the veins, or touch him in the quick. To find where the grievance lies, they knock the nails round with a hammer, till the horse, shrinking upon hitting a particular nail, discovers the place. Some farriers give this as a rule, that, throwing water on the hoof, the place where he is hurt will dry sooner than any of the rest. The places where the horses are most usually pricked, are the heel in the fore foot, and the toe in the hind foot.

RETRAHENS *auriculam*, in anatomy, a muſcle of the external ear, conſiſting of a parcel of fleſhy fibres, which in ſome bodies are divided into three diſtinct muſcles ariſing from the os temporale, and fixed to the hind part of the concha. But theſe muſcles are ſo ſmall in men, that the auricle is ſeldom moveable at all. See the article EAR.

RETRAXIT, in law, is where a plaintiff comes in perſon to the court where his action is brought, and declares he will not proceed in it, in which caſe the action is barred for ever.

A retraxit differs from a nonſuit in this, that it is always where the plaintiff or demandant is perſonally in court. See the article NON-SUIT.

RETREAT, in war, the retiring or moving back again of any army or part thereof.

RETREAT, or RELAY, in maſonry, a little receſs or diminution of the thickneſs of a wall, rampart, &c. in proportion as it is raiſed. The retreat, properly, is the diminution of a wall withoutſide, or the contraction of its upper courſes more than the foundation. Where the foundation is very long, they uſually make two or three retreats.

RETRENCHMENT literally ſignifies ſomething cut off or taken from a thing; in which ſenſe it is the ſame with ſubtraction, diminution, &c.

RETRENCHMENT, in the art of war, any kind of work raiſed to cover a poſt, and fortify it againſt the enemy, ſuch as faſcines loaded with earth, gabions, barrels of earth, ſand-bags, and generally all things that can cover the men and ſtop the enemy. But retrenchment is more particularly applicable to a foſs bordered with a parapet; and a poſt fortified thus is called poſt retrenched, or ſtrong poſt.

Retrenchments are either general or particular: general retrenchments are new fortifications made in a place beſieged, to cover the beſiegers when the enemy become maſters of a lodgment on the fortification, that they may be in a condition of diſputing the ground inch by inch, and of putting a ſtop to the enemy's progreſs in expectation of relief. See the article RETIRADE.

Particular retrenchments are ſuch as are made in the baſtions when the enemy are maſters of the breach. Theſe can never be made but in new full baſtions, for in empty, or hollow ones, there can only be made retirades. The particular retrenchments are made ſeveral ways, according to the time they have to cover themſelves: ſometimes they are made before-hand, which are certainly the beſt. The parapets of ſuch retrenchments ought to be five or ſix feet thick, and five feet high, with a large and deep foſs, from whence ought to run out ſmall fougades and countermines. See FOUGADE.

RETRIBUTION, *retributio*, a handſome preſent, gratuity, or acknowledgment, given inſtead of a formal ſalary, or hire, to perſons employed in affairs that do not ſo immediately fall under eſtimation, nor within the ordinary commerce in money.

RETRIEVE, to recover, get again, or repair a thing loſt or damaged.

To retrieve, in falconry, ſignifies to ſpring or find partridges again which have been once ſprung before.

RETROACTIVE, in law, that which has an influence or effect on time paſt.

RETROCESSION, *retroceſſio*, the act of going backwards; more uſually called retrogreſſion, or retrogradation. See the next article.

RETROCESSION *of the equinox.* See the article PRECESSION.

RETROGRADATION, or RETROGRESSION, the act or effect of a thing moving backwards.

The retrograde motion of the planets is an apparent motion, whereby they ſeem, to an obſerver placed on the earth, to move backwards, or contrary to the ſigns. See the articles PLANET, ORBIT, &c.

As to the retrograde motion of the ſun, when in the torrid zone, and has his declination AM (plate CCXXXII. fig. 3.) greater than the latitude of the place AZ, but either northern or ſouthern as that is, the ſun will appear to go backwards, or to be retrograde both before and after noon.

For draw the vertical circle, ZGN, to be a tangent to the ſun's diurnal circle in G, and another, ZON, through the ſun riſing in O. It is evident all the intermediate vertical circles cut the ſun's diurnal circle twice; firſt, in the arch GO, and the ſecond time in the arch GI. Wherefore, as the ſun aſcends through the arch GO, it continually arrives at farther and farther verticals. But, as it continues its aſcent through the arch GI, it returns to its former verticals; and, therefore, is ſeen retrograde for ſome time before noon. The ſame, as may be ſhewn after the ſame man-

ner, it does for fome time after noon.

The retrograde motion of the nodes, is a motion of the line of nodes, whereby it continually fhifts its fituation from eaft to weft, contrary to the order of the figns; completing its retrograde circulation in the compafs of about nineteen years, after which time either of the nodes, having receded from any point of the ecliptic, returns to the fame again.

RETROGRESSION *of curves*, their bending or turning backwards. See the articles FLEXURE and INFLECTION.

RETROMINGENTS, in natural hiftory, a clafs or divifion of animals, whofe characteriftic it is that they ftale, or make water, backwards, both male and female.

RETURN, *returna*, or *retorna*, in law, is ufed in divers fenfes. 1. Return of writs by fheriffs and bailiffs is a certificate made by them to the court, of what they have done in relation to the execution of the writ directed to them. This is wrote on the back of the writ by the officer, who thus fends the writ back to the court from whence it iffued, in order that it may be filed. 2. Return of a commiffion, is a certificate or anfwer fent to the court from whence the commiffion iffues, concerning what has been done by the commiffioners. 3. Returns, or days in bank, are certain days in each term, appointed for the return of writs, &c. Thus Hillary term has four returns, *viz.* in the king's bench, on the day next after the octave, or eighth day after Hillary day: on the day next after the fifteenth day from St. Hillary: on the day after the purification, and on the next after the octave of the purification. In the common pleas, in eight days of St. Hillary: from the day of St. Hillary, in fifteen days: on the day after the purification: in eight days of the purification. Eafter term has five returns, *viz.* in the king's bench, on the day next after the fifteenth day from Eafter: on the day next after three weeks from Eafter: on the day next after one month from Eafter: on the day next after five weeks from Eafter: and on the day next after the day following afcenfion-day. In the common pleas, in fifteen days from the feaft of Eafter: in three weeks from the feaft of Eafter: in one month from Eafter day: in five weeks from Eafter day: on the day after the afcenfion-day. Trinity term has four returns, *viz.* on the day following the fecond day after Trinity: on the day following the eighth day after Trinity: on the day next after the fifteenth day from Trinity: on the day next after three weeks from Trinity. In the common pleas, on the day after Trinity: in eight days of Trinity: in fifteen days from Trinity: in three weeks from Trinity. Michaelmas term has fix returns, *viz.* on the day next after three weeks from St. Michael: on the day next after one month of St. Michael: on the day following the fecond day after All-fouls: on the day next after the fecond day after St. Martin: on the day following the octave of St. Martin: on the day next after fifteen days of St. Martin. In the common pleas, in three weeks from St. Michael: in one month from St. Michael: on the day after All-fouls: on the day after St. Martin: on the octave of St. Martin: in fifteen days from St. Martin. It is to be obferved, that, as in the king's bench, all returns are to be made on fome particular day of the week in each term, care muft be taken not to make the writs out of that court returnable on a non-judicial day; fuch as Sunday, and All-faints, in Michaelmas term, the purification in Hillary, the afcenfion in Eafter, and Midfummer-day, except it fhould fall on the firft day of Trinity term. See the article TERM.

RETURN, in building, is a fide or part that falls away from the forefide of any ftrait work.

RETURNS *of a trench*, in fortification, are the turnings and windings which form the lines of a trench.

RETURNS *of a mine*, in fortification, are the windings of the gallery. See the articles GALLERY and MINE.

RETURNO HABENDO, or RETURNUM AVERIORUM, is a writ which lies for a perfon who has avowed a diftrefs by him made, and proved the fame to be lawfully taken, for returning to him the cattle diftrained which were before replevied by the party diftrained.

The fame writ is alfo granted when the action is removed by recordari or accedas ad curiam, into the court of common pleas; and he whofe cattle were diftrained, makes default and does not profecute his action.

RETURNUM IRREPLEGIABILE, a writ for the final return of cattle to the owner, when found to be unjuftly diftrained.

REVE, REEVE, or GREVE, the bailiff of a franchife, or manor, thus called, efpe-

cially in the weſt of England. Hence ſhire-reve, ſheriff, port-greve, &c. See the article GREVE.

REVEILLE, a beat of drum about break of day, to give notice that it is time for the ſoldiers to ariſe, and that the centries are to forbear challenging.

REVEL, a port-town of Livonia, ſituated at the ſouth entrance of the gulph of Finland: eaſt long. 24°, north lat. 59°.

REVELATION, the act of revealing, or making a thing public that was before unknown: it is alſo uſed for the diſcoveries made by God to his prophets, and by them to the world; and more particularly for the books of the Old and New Teſtament. See the articles BIBLE, INSPIRATION, FAITH, PROPHECY, &c.

The principal teſts of the truth of any revelation are, its being worthy of God, and conſiſtent with his known attributes, its being agreeable to the clear dictates of unprejudiced reaſon, and its having a tendency to refine, purify, and exalt the mind of man to an imitation of the Deity in his moral perfections.

Mr. Locke, in laying down the diſtinct provinces of reaſon and faith, obſerves, 1. That the ſame truths may be diſcovered by revelation, which are diſcoverable to us by reaſon. 2. That no revelation can be admitted againſt the clear evidence of reaſon. 3. That there are many things of which we have but imperfect notions, or none at all; and others, of whoſe paſt, preſent, or future exiſtence, by the natural uſe of our faculties we cannot have the leaſt knowledge: and theſe, being beyond the diſcovery of our faculties, and above reaſon, when revealed become the proper objects of our faith. He then adds, that our reaſon is not injured or diſturbed, but aſſiſted and improved by new diſcoveries of truth coming from the fountain of knowledge. Whatever God has revealed is certainly true: but whether it be a divine revelation or no, reaſon muſt judge, which can never permit the mind to reject a greater evidence to embrace what is leſs evident. There can be no evidence that any traditional revelation is of divine original, in the words we receive it, and the ſenſe we underſtand it, ſo clear and ſo certain, as that of the principles of reaſon: and, therefore, nothing that is contrary to the clear and ſelf-evident dictates of reaſon, has a right to be urged or aſſented to as a matter of faith, wherein reaſon has nothing to do. Whatſoever is divine revelation ought to over-rule all our opinions, prejudices, and intereſts, and has a right to be received with full aſſent: and ſuch a ſubmiſſion as this, of our reaſon to faith, takes not away the landmarks of knowledge.

REVELATION *of St. John*, the ſame with the apocalypſe. See APOCALYPSE.

REVELS, entertainments of dancing, maſking, acting comedies, farces, &c. antiently very frequent in the inns of court, and in noblemens houſes, but now much diſuſed. The officer who has the direction of the revels at court, is called the maſter of the revels.

REVENUE, the annual income a perſon receives from the rent of his lands, houſes, intereſt of money in the ſtocks, &c.

REVENUE, in hunting, a fleſhy lump formed chiefly of a cluſter of whitiſh worms on the heads of deer, ſuppoſed to occaſion their caſting their horns by gnawing them at the roots.

REVENUE is alſo uſed for a new tail of a partidge, growing after the lop of a former; this is meaſured by fingers; and thus they ſay a partridge of two, three, or four fingers revenue.

REVERBERATION, *reverberatio*, in phyſics, the act of a body repelling or reflecting another after its impinging thereon. See the article REPULSION.

REVERBERATION, in chemiſtry, denotes a kind of circulation of the flame by means of a reverberatory, or the return of the flame from the top of the furnace back to the bottom, chiefly uſed in calcination. Reverberation is of two kinds: the firſt with a cloſe fire, that is, a reverberatory furnace, where the flame has no vent at top, being covered with a dome or capital, which repells its action back on the matter or the veſſel that contains it, with increaſed vehemence. After this manner is refining, the diſtillation of acids, ſpirits, &c. performed. Reverberation with an open fire is that performed in a furnace or reverberatory, whoſe regiſters are all open, uſed in calcination, &c. See the next article.

REVERBERATORY, or REVERBERATING FURNACE, a chemical furnace built cloſe all around, and covered at the top with a capital of brick or tiles, ſo as not to give any vent to the heat or flame, but to determine it to reverberate or turn back from the brick-work with new force upon the matter placed at bottom. When the fire has no vent or paſſage atop, it is a whole reverberatory. When

the middle of the capital is open, and only the ſides cloſe, ſo that there is only a half circulation of the flame, it is called an half reverberatory. The reverberatory furnace is chiefly uſed in the fuſion and calcination of metals and minerals, and on other occaſions where the moſt intenſe heat is required, as in aſſaying, *&c.* Whence it is alſo called the melting furnace, and aſſaying furnace. See the articles FURNACE, *Aſſaying* OVEN, LABORATORY, *&c.*

REVEREND, *reverendus*, a title of reſpect given to eccleſiaſtics.

The religious abroad are called reverend fathers; and abeſſes, prioreſſes, *&c.* reverend mothers. With us, biſhops are right reverend, and archbiſhops, moſt reverend. In France, their biſhops, archbiſhops, and abbots, are all alike moſt reverend.

REVERIE, the ſame with delirium, raving, or diſtraction. See DELIRIUM, *&c.* It is uſed alſo for any ridiculous, extravagant imagination, action, or propoſition, a chimera or viſion. But the moſt ordinary uſe of the word, among engliſh writers, is for a deep diſorderly muſing or meditation.

REVERO, a town of Italy, in the dutchy of Mantua, ſituated on the ſouth of the Po, oppoſite to Oſtiglia, fifteen miles ſouth-eaſt of Mantua.

REVERSE, in law, *&c.* To reverſe ſignifies to undo, repeal, or make void.

REVERSE *of a medal, coin,* &c. denotes the ſecond or back-ſide, in oppoſition to the head or principal figure.

REVERSE, in fencing, a back ſtroke. See the article FENCING.

REVERSED, in heraldry, a thing turned backwards, or upſide down.

REVERSION, *reverſio*, in law, is defined to be returning of lands, *&c.* into the poſſeſſion of the donor, or his heirs.

Reverſion, in the law of England, has two ſignifications; the one of which is an eſtate left, which continues during a particular eſtate in being; and the other is the returning of the land, *&c.* after the particular eſtate is ended; and it is further ſaid, to be an intereſt in lands, when the poſſeſſion of it fails, or where the ſtate which was for a time parted with, returns to the grantors, or their heirs. But, according to the uſual definition of a reverſion, it is the reſidue of an eſtate left in the grantor, after a particular eſtate granted away ceaſes, continuing in the grantor of ſuch an eſtate. The difference between a remainder and a reverſion, conſiſts in this, that the remainder may belong to any man except the grantor; whereas the reverſion returns to him who conveyed the lands, *&c.* See the article REMAINDER.

In order to render the doctrine of reverſions eaſy, we ſhall give the following table; which ſhew the preſent value of one pound, to be received at the end of any number of years not exceeding forty; diſcounting at the rate of 5, 4, and 3 per cent. compound intereſt. See the article INTEREST.

| Years | Value at 5 per Cent. | Value at 4 per Cent. | Value at 3 per Cent. |
|---|---|---|---|
| 1 | .9524 | .9615 | .9709 |
| 2 | .9070 | .9245 | .9426 |
| 3 | .8638 | .8898 | .9151 |
| 4 | .8227 | .8548 | .8885 |
| 5 | .7835 | .8219 | .8626 |
| 6 | .7462 | .7903 | .8375 |
| 7 | .7107 | .7599 | .8131 |
| 8 | .6768 | .7307 | .7894 |
| 9 | .6446 | .7026 | .7664 |
| 10 | .6139 | .6756 | .7441 |
| 11 | .5847 | .6496 | .7224 |
| 12 | .5568 | .6246 | .7014 |
| 13 | .5303 | .6006 | .6809 |
| 14 | .5051 | .5775 | .6611 |
| 15 | .4810 | .5553 | .6419 |
| 16 | .4581 | .5339 | .6232 |
| 17 | .4363 | .5134 | .6050 |
| 18 | .4155 | .4936 | .5874 |
| 19 | .3957 | .4746 | .5703 |
| 20 | .3769 | .4564 | .5537 |
| 21 | .3589 | .4388 | .5375 |
| 22 | .3418 | .4219 | .5219 |
| 23 | .3255 | .4057 | .5067 |
| 24 | .3100 | .3901 | .4919 |
| 25 | .2953 | .3757 | .4776 |
| 26 | .2812 | .3607 | .4637 |
| 27 | .2678 | .3468 | .4502 |
| 28 | .2551 | .3335 | .4371 |
| 29 | .2429 | .3206 | .4243 |
| 30 | .2314 | .3083 | .4120 |
| 31 | .2204 | 2965 | .4000 |
| 32 | .2099 | .2851 | .3883 |
| 33 | .1999 | .2741 | .3770 |
| 34 | .1903 | .2636 | .3660 |
| 35 | .1813 | .2534 | .3554 |
| 36 | .1726 | .2437 | .3450 |
| 37 | .1644 | .2343 | .3350 |
| 38 | .1566 | .2253 | .3252 |
| 39 | .1491 | .2166 | .3158 |
| 40 | .1420 | .2083 | .3066 |

The

The use of the preceding table.—To find the present value of any sum to be received at the end of a given term of years, discounting at the rate of 3, 4, or 5 per cent. compound interest. Find by the above table the present value of 1 l. to be received at the end of the given term, which multiply by the number of pounds proposed (cutting off four figures from the product on account of the decimals) then the result will be the value sought: For example, the present value of 10,000 l. to be received ten years hence, and the rate of interest 5 per cent. is equal to .6139 × 10000 = 6139.0000 l. or 6139 l. Again, the present value of 10,000 l. due in ten years, the rate of interest being 3 per cent. is .7441 × 10,000 = 7441.

REVERSION *of series*, in algebra, a kind of reversed operation of an infinite series. See the article SERIES.

REVIEW, in chancery, is used for a bill, where a cause has been heard, and a decree thereon signed; but some error in law appearing upon the decree, or new matter being discovered after it was made, this bill is given for a fresh examination into the merits of the cause.

A bill of review must be exhibited by leave of the court, and is generally obtained upon oath made of the discovery of such new matter. The sum of 20 l. must likewise be paid into court on the bringing of this bill, by way of security for costs and delay, in case the matter should be found against the party.

If one part of a decree in chancery be repugnant to another, the decree may be reversed by a bill of review.

REVIEW, in war, is the appearance of an army, or part of an army, in order of battle, and their being viewed by the general, that he may know the condition of the troops, see that they are complete, and be a witness of the expertness with which they perform their evolutions and other exercises.

REVISE, among printers, a second or third proof of a sheet to be printed, taken off in order to be compared with the last proof, to see whether all the mistakes marked in it are corrected. See the article PRINTING.

REVIVIFICATION, in chemistry, the same with resuscitation. See the article RESUSCITATION.

*Bill of* REVIVOR, in chancery, is a bill for reviving a cause, where either of the parties dies after the bill and answer, and before the cause is heard, or if heard, before the decree is inrolled: in which case this bill must be brought, praying that the former proceeding may stand revived, and be put upon the same footing as at the time of the abatement.

REVOCATION, in law, signifies the recalling, or annulling and making void some power, grant, deed, *&c.* made before.

REVOLUTION, in politics, signifies a grand change or turn in government. In which sense, the revolution is used by way of eminence, for the great turn of affairs in England, in the year 1688, when king James II. abdicating the throne, the prince and princess of Orange were declared king and queen of England, *&c.*

In geometry the revolution of any figure, is its motion quite round a fixed line, as an axis.

The revolution of a planet, or comet, round the sun, is nothing but its course from any point of its orbit till its return to the same. See ORBIT, PERIOD, PLANET and COMET.

REVULSION, in medicine, turning a flux of humours from one part to another, by bleeding, cupping, friction, sinapisms, blisters, fomentations, bathings, issues, setons, strong purging of the bowels, *&c.* Dr. Van Sweiten, in his Commentaries upon the Aphorisms of Boerhaave, observes, that the use of revulsions in diseases, is confirmed by daily experience as well as by reason; for so soon as the resistance to the blood's motion is either diminished or totally removed in any part of the body, it immediately flows into that part with a greater velocity. Thus when all the vessels and viscera of the abdomen are suddenly freed from a considerable pressure by the birth of an infant, all the blood is frequently derived into those vessels so forcibly, that unless the fluid vessels and viscera are compressed by swathing with a roller, the child-bed woman may suddenly perish in a fatal swoon, for want of the blood's due pressure in the vessels of the brain and cerebellum: the same thing also happens if the abdomen is not swathed, when all the water is discharged at once by paracentesis, in the dropsy. If again we consider, that the blood propelled by the heart is sent partly up to the head, and superior parts of the trunk, and partly downward to the viscera and lower extremities, it will be from hence evident, that, by diminishing the resistance of the lower

lower veſſels, or by evacuating them, the quantity and impulſe of the blood will then be derived more towards the inferior parts, and drawn from thoſe that are ſuperior. It is therefore poſſible to make a revulſion of the arterial blood from an inflamed part to any other, eſpecially when the part towards which the revulſion is made, receives its blood from the ſame common trunks or larger arteries. The phyſicians foment the external parts of the head in inflammatory diſorders thereof, that the impulſe of the blood, being increaſed in the branches of the external carotide, may preſs with a leſs force upon the parts contained in the head. And Galen has long ago obſerved, that pains are eaſed almoſt as with a charm, by making a revulſion with cupping-glaſſes.

The different kinds of revulſion are phlebotomy, cupping, friction, veſicatories, iſſues, ſetons, warm bathing, fomentations, *&c.* See PHLEBOTOMY, CUPPING, FRICTION, VESICATORY, *&c.*

REYGATE, or RYGATE, a borough of Surry, twenty-two miles ſouth-weſt of London.

It ſends two members to parliament.

REZANSKOI, the capital of the province of Rezan, in Ruſſia: eaſt long. 41°, north lat. 55°.

RHABDOIDES, in anatomy, the ſame with the ſagittal ſuture of the ſkull. See the articles SKULL and SUTURE.

RHABDOLOGY, in arithmetic, the doctrine of Neper's rods. See NEPER.

RHABDOMANCY, ῥαβδομαντεια, a ſpecies of divination performed by means of rods. See the article DIVINATION.

RHACHITIS, in medicine, the rickets. See the article RICKETS.

RHAGADES, in medicine, denotes chaps or clefts in any part of the body; ariſing either from an aridity of the parts, or acrimony of the humours; in both which caſes, cooling and emollient applications are proper.

RHAGOIDES, in anatomy, the ſecond coat or tunic of the eye, more uſually called uvea. See the article UVEA.

RHALADERGWY, a market-town in Radnorſhire, in Wales, ſituated fifteen miles weſt of Rador.

RHAMNUS, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle, imperforated, infundibuliform petal, rude on the outſide, and coloured within: the tube is of a turbinated cylindric figure; the limb patent, divided and acute at the baſe of every ſegment: the petal has little ſquammula, and is connivent inwardly; the fruit is a roundiſh naked berry, divided within into fewer cells than there are ſegments of the corolla; the ſeeds are ſingle, roundiſh, gibbous, and compreſſed on one ſide.

This genus comprehends the buckthorn, the black alder, Chriſt's thorn, the alaternus and the jujube-tree. See the articles JUJUBE and ALATERNUS.

Buckthorn-berries bruiſed on white paper, give it a green tincture; they are in conſiderable eſteem as a cathartic, and are celebrated in dropſies, rheumatiſms, and even in the gout; but they generally occaſion gripes, ſickneſs, dry the mouth and throat, and leave a thirſt of long duration: the doſe is about twenty of the freſh berries in ſubſtance, and twice or thrice this number in decoction; an ounce of the expreſſed juice, or a dram of the berries dried. A ſyrup prepared of the juice is kept in the ſhops.

RHAPHONTICUM, the name for the root of the rheum. See RHEUM.

RHAPSODI, ῥαψωδοι, *rhapſodiſts*, in antiquity, perſons who made a buſineſs of ſinging pieces of Homer's poems. Cuper informs us, that the rhapſodi were cloathed in red when they ſung the Iliad, and in blue when they ſung the Odyſee. They performed on the theatres, and ſometimes ſtrove for prizes in conteſts of poetry, ſinging, *&c.* After the two antagoniſts had finiſhed thair parts, the two pieces or papers they were written in were joined together again: whence the name, *viz.* from ῥαπτω, *ſuo*, and ωδη, *canticum*: but there ſeems to have been other rhapſodi of more antiquity than theſe people, who compoſed heroic poems or ſongs in praiſe of heroes and great men, and ſung their own compoſitions from town to town for a livelihood, of which profeſſion Homer himſelf is ſaid to be.

RHAPSODOMANCY, an antient kind of divination performed by pitching on a paſſage of a poet at hazard, and reckoning on it as a prediction of what was to come to paſs. There were various ways of practiſing this rhapſodomancy. Sometimes they wrote ſeveral papers or ſentences of a poet on ſo many pieces of wood, paper, or the like, ſhook them together in an urn, and drew out one which was accounted the lot: ſometimes

they

they cast dice on a table whereon verses were written, and that whereon the die lodged, contained the prediction. A third manner was by opening a book, and pitching on some verse at first sight. This method they particularly called the sortes Prænestinæ; and afterwards, according to the poet made use of, sortes Homericæ, sortes Virgilianæ, *&c.* See the article SORTES.

RHAPSODY, ῥαψῳδία, in antiquity, a discourse in verse sung or rehearsed by a rhapsodist. Others will have rhapsody to signify a collection of verses, especially those of Homer, which having been a long time dispersed in pieces and fragments, were at length, by Pisistratus's order, digested into books called rhapsodies, from ῥαπτω, *suo*, and ωδη, *canticum.* Hence, among moderns, rhapsody is also used for an assemblage of passages, thoughts, and authorities raked together from divers authors, to compose some new piece.

RHE, or REE, a little island in the bay of Biscay, near the coast of Aunis in France: west long. 1° 30′, north lat. 46° 14′.

RHEEDEA, in botany, a genus of plants the characters whereof are not perfectly ascertained: there is no calyx; the corolla consists of four patent, concave, vertically ovated petals; the filaments are numerous, the germen globose; the fruit is oval, small, succulent, and unilocular; the seeds are three, of an ovato-oblong figure, long and odly furrowed.

RHEIMS, or REIMS, a city of France, capital of the province of Champain, one of the most elegant cities in France, situated seventy-five miles north-east of Paris: east long. 4°, north lat. 49° 20′.

RHETORIANS, a sect of heretics in Egypt, so denominated from Rhetorius their leader. The distinguishing doctrine of this heresiarch, as represented by Philastrius, was, that he approved of all the heresies before him, and taught that they were all in the right.

RHETORIC, *rhetorica*, the art of speaking copiously on any subject, with all the advantage of beauty and force.

Lord Bacon defines rhetoric very philosophically, to be the art of applying and addressing the dictates of reason to the fancy, and of recommending them there so as to affect the will and desires. The end of rhetoric, the same author observes, is to fill the imagination with ideas and images which may assist nature without oppressing it. Vossius defines rhetoric, the faculty of discovering what every subject affords of use for persuasion. Hence, as every author must invent arguments to make his subject prevail, dispose those arguments, thus found out, in their proper places, and give them the embelishments of language proper to the subject; and if this discourse be intended to be delivered in public, utter them with that decency and force which may strike the hearer; rhetoric becomes divided into four parts, invention, disposition, elocution, and pronunciation. See INVENTION, DISPOSITION, ELOCUTION, and PRONUNCIATION.

Rhetoric and oratory differ from each other as the theory from the practice; the rhetorician being he who describes the rules of eloquence, and the orator he who uses them to advantage. Ordinarily, however, the two are used indifferently for each other. See the article ORATORY.

For the characters in rhetoric, see the article CHARACTER.

RHETORICAL NUMBERS. See the article NUMBER.

RHEUM, ῥευμα, a thin serous humour, occasionally oosing out of the glands about the mouth and throat. See the article HUMOUR.

Rheum is also used for a catarrh. See the article CATARRH.

For the rheum in the eyes, see the article EPIPHORA.

RHEUM, the RHAPHONTIC PLANT, in botany, a genus of the enneandria-trigynia class of plants, the corolla whereof consists of a single petal, which is narrow at the base, and impervious: the limb is divided into six obtuse segments, alternately smaller: there is no pericarpium: the seed is single, large, triquetrous, acute, and surrounded with membranaceous rims.

The root of this plant, which appears evidently to have been the rhubarb of the antients, is by many comfounded with the modern rhubarb, though considerably different both in appearance and quality. The raphontic root is of a dusky colour on the surface, of a loose spongy texture, considerably more astringent, but less purgative than the rhubarb; in this last intention two or three drams are required for a dose. It is an ingredient in the venice-treacle, and in some of the colder

colder compositions of the shops, but in these rhubarb is generally used in its place.

Rhaphontic-root, the pound, pays, on importation, 2 s. and 7 d. and, on exportation, draws back 2 s. $3\frac{20}{100}$d.

RHEUMATISM, in medicine, a distemper that happens most commonly in spring or autumn, when there is a remarkable change of air from hot to cold, and from cold to hot, or when the wind suddenly shifts to any opposite point. It begins, according to Sydenham, with a shivering and other symptoms of a fever, and in a day or two's time, or sometimes sooner, a vehement pain seizes one or more of the limbs, raging sometimes in one place and sometimes in another, especially in the arms, wrists, shoulders, and knees: very often there is a redness and swelling, and the fever gradually goes off while the pain remains. This distemper often runs out into a great length, continuing sometimes for some months or years, not perpetually, with the same violence, but coming and going, and from time to time renewing its paroxysms.

It chiefly attacks persons in the flower of their age, after violent exercise, or a great heat of the body from any other cause, and then being too suddenly cooled. Its proximate cause Boerhaave takes to be an inflammation of the lymphatic arteries of the membranes near the ligaments of the joints, but not so violent as to bring on a suppuration. This disease is nearly a-kin to the gout and scurvy, and the blood is like that of those afflicted with the pleurisy. The pain is exasperated upon the least motion: it sometimes attacks the loins and coccendix, and sometimes the brain, lungs, and viscera: when it seizes the loins it is then called lumbago: in this case, Sydenham observes that there is a most violent pain in the small of the back, which sometimes extends to the os sacrum, and is like a fit of the gravel, only the patient does not vomit. If this disease is unskilfully treated, it may continue several months or years, but not always with the same violence, but by fits. If it continues and increases, it may cause a stiff joint, which will scarce yield to any remedy.

Sydenham directs to take away ten ounces of blood on the side affected; this must be repeated three or four times, or oftener, once every other or every third day, according as the strength of the patient will bear. The diet must be very thin, and an emulsion of the four cold seeds may be given; as also a pultice of white-bread and milk, tinged with a little saffron, may be laid to the part affected: a clyster of milk and sugar may be injected on those days the bleeding is omitted. If the patient cannot bear frequent bleeding, after the second or third time give the common purging potion every other day, and an ounce of diacodium at night, till he recovers.

In an incipient rheumatism of the shoulders, Hoffman says that nothing is better than a blister laid between the scapulæ; but if it happens to the plethoric, cupping, with scarification in the lower parts, repeated every month, does signal service. The same physician thinks it may be proper to chew rhubarb, from two scruples to a dram, with raisins or currants, two or three times a week.

The spirit of hartshorn and the balsam of guaiacum, given in the quantity of twenty or thirty drops, three or four times a day, Dr. Shaw says, is of great service: but he thinks nothing better than a decoction of the sudorific woods, to the quantity of a quart a day, for a month or six weeks together. This last, when assisted with crude antimony and mercurius dulcis, Hoffman recommends in the venereal rheumatism, which often rises from the remains of a lues venerea contained in the mass of blood. In a scorbutic rheumatism, or that arising from the scurvy, Sydenham directs the patient to take the scorbutic electuary and water, if he cannot bear any kind of evacuation.

He observes, that young persons who live temperately may be cured by a simple refrigerating diet, and moderate nourishing, with as much certainty as by repeated bleeding: for instance, let the patient live four days upon whey alone; and after that white bread may be allowed for dinner, and on the last day of his illness he may be allowed it for supper. When the symptoms cease he may have boiled chickens, or any thing of easy digestion, but every third day he must live upon whey only, till his strength returns. Boerhaave's method of cure is to the same effect, only he advises warm baths and strong blisters to be laid upon the part affected, nay even cauteries themselves: but Hoffman observes that great caution should be used with regard to topics, for if the patient's consti-

tution is sanguineous they should all be avoided, and the part covered carefully with the bed-cloaths; but if there is a thick, cold, stagnating humour in the part, and a sense of cold, with a stricture of the pores, then frictions may be used with rough warm cloths, and afterwards cupping with scarifications. If the part becomes stiff and inflexible, with a numbness, which is called a paresis, then take human or canine axungia, two ounces; balsam of Peru, and oil of cloves, each two drams; with which make a liniment for the part: this has been known to have a wonderful effect. Arbuthnot says that cream of tartar in water-gruel, taken for several days, will abate the pains and swellings considerably by its acidity, correcting the alkaline salts of the blood.

Cheyne says, that the hot and inflammatory rheumatisms have all the symptoms of the gout, and, like it, change from place to place, and by over violent evacuations may be translated upon the noble organs.

RHEXIA, in botany, a genus of the octandria-monogynia class of plants, the corolla whereof consists of four roundish patent petals inserted into the calyx; the fruit is a roundish capsule, formed of four valves, containing four cells, and inclosed in the belly of the cup; the seeds are roundish and numerous.

RHEXIS, among oculists, denotes a rupture of the cornea of the eye. See the article EYE.

RHIME, in poetry. See RHYME.

RHINANTHUS, YELLOW-RATTLE, in botany, a genus of the didynamia-angiospermia class of plants, the corolla whereof is a ringent single petal; the tube is almost cylindric, and of the length of the cup; the limb is dehiscent, and compressed at the base; the upper lip is galeated, compressed, emarginated and narrow; the lower one is patulous, plane and semitrifid: the fruit is an orbiculated, erect, compressed, bilocular and bivalved capsule: the seeds are numerous and compressed.

RHINE, a great river rising in the country of the Grisons, in Switzerland, and, running north, continues its course till it forms the lake of Constance; from whence it turns west, and having visited Basil, runs north, dividing Suabia from Alsatia; from thence it runs through the Palatinate, and receiving the Neckar, the Maine and the Moselle, continues its course north by Mentz, &c. After entering the Netherlands at Skenkinchans, it is divided into several channels, the two largest whereof obtain the names of the Lech and the Waal, which running through the United-provinces discharge themselves into the German Sea, below Rotterdam.

RHINE *lower circle* consists of the Palatinate of the Rhine and the three ecclesiastical electorates, *viz.* those of Cologn, Mentz, and Triers.

RHINE *upper circle* consisted of the Landgraves of Alsatia and Hesse, comprehending the Wetteraw: but only Hesse can be accounted a part of Germany at present, France having united Alsace to that kingdom.

RHINEBURG, a town of Germany, in the circle of the lower Rhine and electorate of Cologn, situated fifteen miles east of Gelder.

RHINEFIELD, the name of two towns of Germany, one whereof is situated in the circle of Suabia, on the Rhine, eight miles east of Basil; the other is the capital of the county of Rhinefield, situated in the circle of the Upper Rhine, sixteen miles north-west of Mentz.

RHINE-LAND-ROD, in fortification, &c. a measure of two fathoms, or twelve feet, used by the Dutch and German engineers, &c.

RHINOBATUS, in ichthyology, a species of the raja, with only a single row of prickles in the middle of the back. See the article RAJA.

RHINOCEROS, in zoology, an order of the jumenta, having eleven fore-teeth in each jaw; there are no canine teeth; the nose is ornamented with a single or double horn, which is permanent. This, of all quadrupeds, approaches nearest to the elephant in size, the body being nearly as bulky, but the legs much shorter. A full grown rhinoceros is fourteen feet high, and the legs are so short with all this height, that the belly comes near the ground: the head is very large and oblong, of an irregular figure, broad at top and depressed towards the snout: the ears resemble those of a hog: the eyes are very small, and situated at a small distance from the extremity of the snout: on the upper part of the snout, near the extremity, stands the horn, growing to about two feet and a half in length, bent a little back, of a black colour, and vastly firm and hard: the skin is remarkably thick and hard, so that the

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creature could not turn its body in any direction but for the joints and folds in it: the tail is short, and furnished with some long and extremely thick black hairs. See plate CCXXXII. fig. 2. which represents a young rhinoceros with a short obtuse horn; there being some species which have the horn much longer.

RHINOCEROS BIRD, a large bird about the size of the european raven, which it greatly resembles: it is so called from a true horn, which, rising from the root of the beak, bends upwards. See plate CCXXXII. fig. 6.

There are other two varieties of this horn brought from the East-Indies, all belonging to different species of hydrocorax. See HYDROCORAX.

RHIZOPHORA, in botany, a genus of the dodecandria-monogynia class of plants, called, by Plumier, mangles: the flower is erect, being composed of a single petal, divided into four segments; the seed is single, very long, and of a clavated figure, pointed at the end.

RHODES, the capital of an island of that name, situated in the Mediterranean-sea, in east long. 28°, and between 36° and 37° north lat.

RHODIOLA, or RHODIA, in botany, a genus of the polygamia-dioecia class of plants, which produces two kinds of flowers, *viz.* hermaphrodite and female ones; both which are composed of four petals, only much longer in the hermaphrodite than in the female flowers: the fruit consists of four corniculated capsules, containing numerous roundish seeds.

RHODIUM LIGNUM, RHODIAN WOOD, in botany, the same with aspalathus. See the article ASPALATHUS.

Jamaica affords a wood, called, by the people there, rose-wood; which, though not the rhodium of the shops, has nevertheless much of its smell: it is described by Sir Hans Sloane to be a tree growing to twenty or more feet in height, and thick enough to afford the largest segments we ever meet with of it; and possibly an adulteration of the true rhodium with this wood may be the true cause why the rhodium is not allowed to be the root, but a species of cytisus, as Hoffman affirms.

The flowers of the Jamaica rose-wood are small and white, consisting of three petals, and standing in clusters: the fruit is a berry of the size of a pepper-corn; and the leaves of the tree are pinnated.

RHODODENDRUM, in botany, a genus of the decandria-monogynia class of plants, the calyx of which is a permanent perianthium, divided into five segments; the corolla is a wheel-shaped, funnel-shaped, single petal: the fruit is an oval angular capsule, containing five cells, in which are a great many very small seeds.

RHODON, in pharmacy, an appellation given to several compositions, on account of roses being the chief ingredient in them; as the diarrhodon, rhodosaccharum, *&c.* See DIARRHODON and ROSE.

RHOMBOIDES, in geometry, a quadrilateral figure whose opposite sides and angles are equal, but is neither equilateral nor equiangular; as the figure NOPQ, plate CCXXXII. fig. 5.

RHOMBOIDES, in anatomy, a thin, broad, and obliquely square fleshy muscle, situated between the basis of the scapula and the spina dorsi; so called from its figure. Its general use is to draw, backward and upward, the subspinal portion of the basis scapulæ.

RHOMBOIDIA, in natural history, the name of a genus of spars, given them from their being of a rhomboidal form. They owe this figure to an admixture of particles of iron, and consist of six planes. Of this genus there are only two known species. 1. A white, thin one, with very thin crusts; and, 2. A whitish brown thick one, with thicker crusts. These are both found in the forest of Dean in Gloucestershire, and in other places where there are iron-ores.

RHOMBUS, in geometry, an oblique-angled parallelogram, or a quadrilateral figure whose sides are equal and parallel, but the angles unequal, two of the opposite ones being obtuse, and the other two acute, as ABCD, plate CCXXXII. fig. 4.

To find the area of a rhombus, upon CD, assumed as a base, let fall the perpendicular $Ae$, which is the altitude of the figure; then multiply the base by the altitude, the product will be the area.

RHOMBUS, the PEARL FISH, in ichthyology, a species of pleuronectes, with the eyes on the left side: it is a moderately large species, but is not so thick and fleshy as the turbot, nor is its flesh so well tasted. See the articles PLEURONECTES and TURBOT.

RHONE, one of the largest rivers in France, which rising in one of the Alps of Switzerland, passes through the lake of Geneva, visits that city, and then runs south-west to Lyons, where joining the

the river Soane, it continues its courſe due ſouth, paſſing by Orange, Avignon, and Arles, and falls into the Mediterranean a little weſtward of Marſeilles.

RHOPALIC VERSES, in antient poetry, a kind of verſes, which beginning with monoſyllables, were continued in words growing gradually longer and longer to the laſt.

RHOPOGRAPHI, in antiquity, painters who confined themſelves to low ſubjects, as animals, plants, landſkips, *&c.* See the article PAINTING.

RHUBARB, *rhabarbarum*, in pharmacy, a thick root, of an oblong figure, large at the head, and tapering pretty ſuddenly as it extends in length. It is ſometimes ſingle, but more uſually divided into two or three parts at the lower end. We frequently meet with it in pieces of four, five, or ſix inches long, and three or four in diameter at the top; it is of a tolerably ſmooth and even ſurface, and externally of a faint yellow colour, with a large admixture of brown; it is moderately heavy but not hard; it cuts through very freely and eaſily with a knife, eſpecially if the blade of it has been rendered a little unctuous firſt, by drawing it over an almond or any other fatty ſubſtance. When freſh cut it is found to be of a marbled or variegated appearance; its colours are a pale but bright yellow, and a faint reddiſh. The yellow is the ground-colour, and the red is diſpoſed in ſhort irregular veins, much in the manner of the darker colour in the common nutmeg. It is of a ſomewhat lax and ſpongy texture; it has an agreeable and aromatic ſmell, and a bitteriſh, aſtringent, and ſubacid taſte, upon the whole not diſagreeable: it tinges the ſpittle to a fine bright yellow on being held ſome time in the mouth.

Rhubarb is to be choſen freſh, tolerably hard and moderately heavy, and ſuch as does not duſt the fingers in handling; ſuch as infuſed a few minutes in water gives it a fine yellow, and, when bruiſed in a mortar, has a reddiſh colour with the yellow. Rhubarb is not ſo often adulterated as damaged; care is to be taken that it be not wet, nor rotten; much of it is ſubject, after ſteeping too long, to be worm-eaten and full of holes on the ſurface. There are certain traders in this drug, who have a way of filling up theſe holes with the powder of ſome of the worſt and moſt decayed pieces; but this is eaſily diſcovered, and ſuch rhubarb ought always to be rejected.

The antients were not acquainted with the true rhubarb: their rhubarb appears to be the rheum, or raphontic plant which, tho' Linnæus makes it the ſame with the rhubarb, is yet very different in quality if not in characters. See RHEUM.

The rhubarb is brought to us from Ruſſia, and from the Eaſt Indies. It is produced in great plenty on the confines of China and Tartary, and in many parts of Tartary itſelf: the mountains of Tibet abound with it, and a very conſiderable part of what is ſent into Europe grows there.

It was long before the rhubarb was known in Europe, but of late it has been ſent from Ruſſia to the gardens of Paris and Chelſea, in both which it thrives extremely well, and ſtands the ſevereſt colds unhurt. Other authors make it the lepathum bardanæ folio undulato glabro: and as there are ſufficient proofs that we now have the true rhubarb among us, it will be eaſy to propagate a quantity of it, in order to try whether its virtues, when produced with us, will be the ſame with thoſe it poſſeſſes as brought from its native climate. See LAPATHUM.

The root of the native rhubarb plant is long, thick, and perennial; its bark, while growing, is of a browniſh red colour; but under this the ſubſtance of the root is of the true colour of dried rhubarb, only deeper, of the right nutmeg-grain, marbled with red and yellow, and has the true ſmell and taſte of rhubarb, eſpecially about the upper part of the root: it has a viſcoſity indeed in the mouth, tho' rhubarb, as we meet with it in the ſhops, has not; but this may only be the difference of the ſame root freſh and dried.

Rhubarb poſſeſſes the double virtue of a cathartic and an aſtringent; it readily evacuates particularly the bilious humors, and afterwards gently aſtringes and ſtrengthens the ſtomach and inteſtines. It is given with great ſucceſs in all obſtructions of the liver, in the jaundice, in diarrhœas, and in the fluor albus and gonorrhœas: it is alſo an excellent remedy againſt worms. It is ſometimes given as a purgative, ſometimes as only an alterant; and, which ever way it is taken, it is an excellent medicine, agreeing with almoſt all ages and conſtitutions. The only caſes in which its uſe is

to be avoided, are those in which the blood and viscera are too hot. Fallopius says it is never to be given to people who have disorders of the kidneys or bladder, as it is apt to occasion an extraordinary heat in those parts; and Simon Pauli tells us of vertigoes brought on by a too free and continued use of it.

Rhubarb is given in powder in infusion, and in its own crude solid state; the chewing it perhaps being the best way of giving it of all others, when it is intended to strengthen the stomach and assist digestion; the quantity of twenty-five grains, or thereabout, should be chewed daily on those occasions, an hour before eating; this is also by much the best way of taking it against obstructions of the viscera. Its dose in powder is from half a scruple to two scruples; in infusion, about a drachm of it will purge gently; but the dose may be increased to two drachms. It is observable, that neither the infusion, nor the decoction, nor even the extract of rhubarb, purge near so briskly as the root itself in powder.

The preparations of rhubarb in use in the shops are, 1. The tincture in spirit. 2. The tincture in wine: and, 3. The extract; though the last is but little used.

*Monk's* RHUBARB, *rhaponticum*. See the article RHAPONTICUM.

*White* RHUBARB, a name given to mechoacan. See the article MECHOACAN.

RHUMB, RUMB, or RUM, in navigation, a vertical circle of any given place, or the intersection of such a circle with the horizon; in which last sense rhumb is the same with a point of the compass. See the article COMPASS.

RHUMB-LINE, *loxodromia*, is also used for the line which a ship describes when sailing in the same collateral point of the compass, or oblique to the meridians. Now that such rhumb-lines are spirals, which continually approach to the pole but never fall into it, as A*bcdefg*, plate CCXXXII. fig. 7. is evident for the following reasons. In any place on the surface of the globe, the rhumb running north and south, coincides with the meridian of that place; the east and west rhumbs are perpendicular to the meridian, and the other rhumbs are oblique to it: but this obliquity is the same under every meridian; and therefore all the rhumbs, except the north and south, cut the meridians at equal angles. When right lines are parallel to each other, a right line will cut them at equal angles; but not so when they are inclined to one another: therefore several inclining lines cannot be cut at equal angles, but by a curve line bending towards the place where those lines would meet. Now the meridians being inclined to each other, and meeting in the poles, the oblique rhumbs must be curve-lines continually approaching the poles. But, in every latitude, an oblique rhumb runs between the present parallel and the pole; and a line cannot cut several other lines at equal angles in the same point: consequently the rhumb-lines are spirals, which continually wind round the poles without ever falling into them.

Again, that these spiral rhumbs, on the globe, are of the same kind with the proportional spiral, will appear hence: let PABC, &c. (*ibid.*) be the stereographic projection of part of the sphere, on the plane of the equator; where ABC DEF is part of the equator; P the pole; PA, PB, PC, &c. are meridians; and the spiral A*bcdefg*, one of the rhumbs. Now, in such a projection, the lines intersecting each other, form angles equal to the angles on the sphere which they represent: therefore the projection of the rhumb, A*bcd*, &c. cuts the radii, or meridians, PA, PB, PC, &c. at equal angles; and as this is a property of the proportional spiral, the spiral rhumbs must be analogous to the proportional spiral. Hence the differences of longitude AB, AC, AD, &c. are the logarithms of the intercepted parts of the meridians, P*b*, P*c*, P*d*, &c.

RHUS, SUMACH, in botany, &c. the name given by Linnæus to a plant called COTINUS by other authors, and already described under that name. See also the article SUMACH.

RHYME, RHIME, RYME, or RIME, in poetry, the similar sound, or cadence and termination of two words which end two verses, &c. Or rhyme is a similitude of sound between the last syllable or syllables of a verse, succeeding either immediately or at a distance of two or three lines.

Rhymes are either single, double, or triple, though the two last are much disused. Single rhymes are divided into perfect or whole rhymes, and imperfect or half rhymes. A whole or perfect rhyme is where there is a similitude of sound without any difference: an imperfect

rhyme

rhyme is where there is a ſimilitude of ſound, with a difference either in reſpect of the pronunciation or orthography, but chiefly the former. Single rhymes are again divided into feminine and maſculine rhymes: the feminine rhyme is that where the laſt ſyllable of the rhyme ends with an *e* mute: and the maſculine rhymes are thoſe of all other words. Double rhymes are thoſe where two words terminate alike through the whole two laſt ſyllables. Plain rhymes are thoſe where the two rhyming verſes ſucceed immediately to each other: and croſs rhymes are thoſe where the verſes are ſo diſpoſed as that the firſt rhymes with the third, and the ſecond with the fourth.

There is no rule in poetry, ſays Du Bos, whoſe obſervance coſts ſo much trouble, and is productive of leſs beauties in verſe, than that of rhyming. Rhyme frequently maims and almoſt always enervates the ſenſe of the diſcourſe, for one bright thought which the paſſion of rhyming throws in our way by chance, is, without doubt, every day the cauſe of a hundred others that people would bluſh to make uſe of were it not for the richneſs or novelty of the rhyme with which theſe thoughts are attended.

And yet the allurement of rhyme has nothing in it worth comparing to the charms of numbers and harmony. The terminating of a ſyllable with a particular ſound is no beauty in itſelf. The beauty of a rhyme is only a relative one, which conſiſts in a conformity of termination between the two laſt or two correſponding verſes. This ornament therefore, which is of ſo ſhort a duration, is perceived only at the end of two verſes, and after having heard the laſt word of the ſecond verſe, which rhymes to the firſt. One is not even ſenſible of this pleaſure, but at the end of three or four verſes, if the maſculine and feminine rhymes are interwoven, ſo that the firſt and fourth be maſculines, and the ſecond and third feminines: a mixture which is very much uſed in ſeveral kinds of poetry. But even in thoſe verſes where the richneſs thereof diſcovers itſelf at the end of the ſecond verſe, it is the greater or leſſer conformity between the two laſt words of theſe verſes, which forms its elegance. Nor, for the moſt part, do people upon hearing the ſecond rhyme, recal the firſt diſtinctly enough to be charmed with their perfection. Their merit is known rather by reflection than ſenſation, ſo trifling is the pleaſure by which it tickles the ear. Numbers and harmony are a light which throws out a conſtant luſtre; but rhyme is a mere flaſh, that diſappears after having given only a ſhort-lived ſplendor. See the articles NUMBER, METRE, *&c.*

Rhyme owes its origin to the barbarouſneſs of our anceſtors. The people from whom the modern nations are deſcended, and who ſubverted the roman empire, had their poets, who being ignorant, and the languages in which they wrote not ſufficiently improved to bear a handling according to the rules of metre, they fancied there would be ſome ornament in terminating with the ſame ſound two conſecutive or relative parts of a diſcourſe, both of which were to be of an equal extent. Thus, in all probability, it was that rhyme firſt roſe in Europe. Theſe new-born languages were not only forced to ſubmit to the ſlavery of rhyming, but it paſſed even to the latin tongue, the uſe of which was ſtill retained by a particular ſet of people. The practice of leonine verſe was introduced as early as the VIIth century, and prevailed at the time the following ones were made,

*Fingitur hac ſpecie bonitatis odore refertus,*
*Iſtius eccleſiæ fundator rex Dagobertus.*

Theſe leonine verſes diſappeared upon the riſing of that light, whoſe dawn appeared in the XVth century.

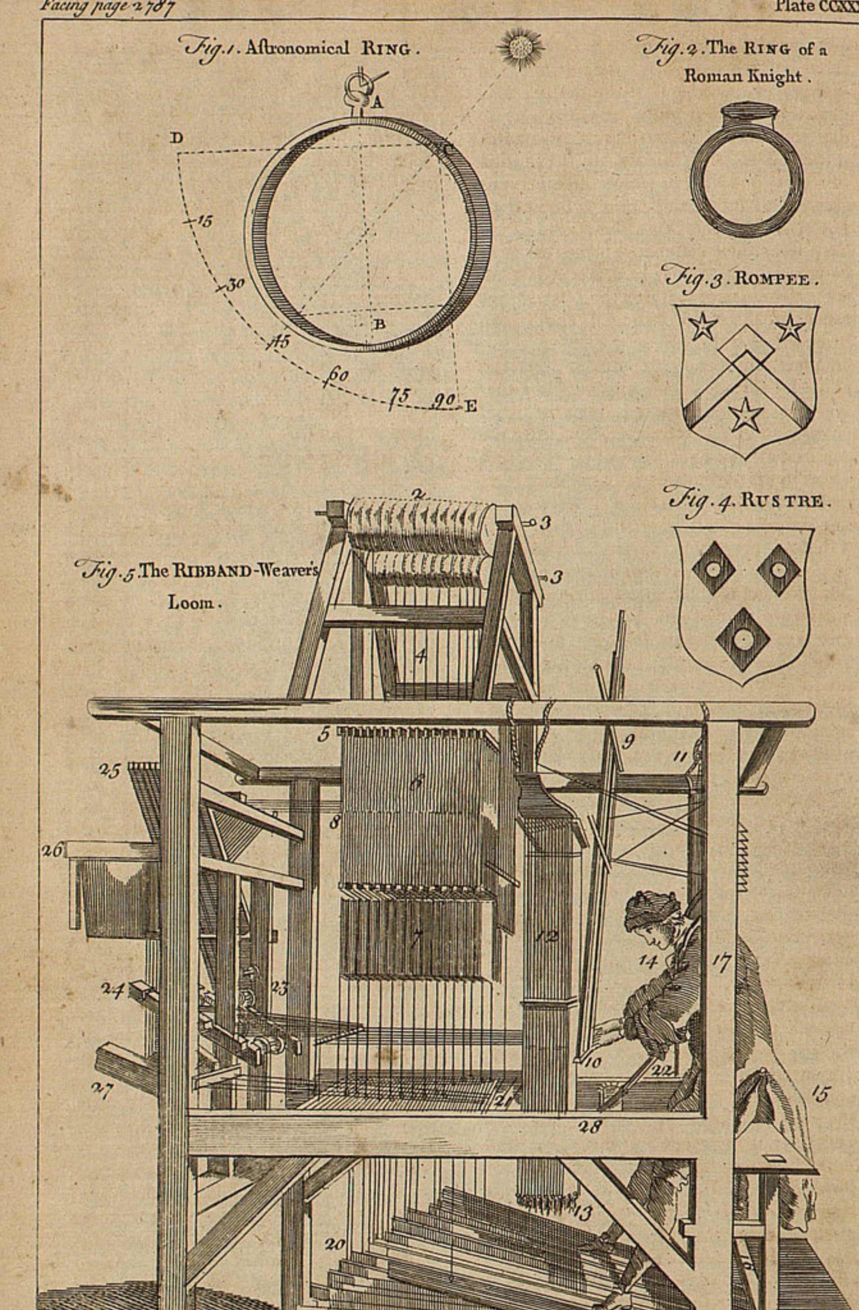
Since the reſtoration of learning in the XVIth century, attempts have been made to baniſh rhyme out of the modern poetry, and to ſettle the engliſh and french verſes on the footing of the antient greek and latin ones, by fixing the quantities of ſyllables and truſting wholly to thoſe, and to the numbers and meaſure. This Milton has done with great ſucceſs, and after him Philips, Addiſon, Thomſon, Young, and ſome others. Verſes of this kind are called blank verſes. The French have attempted the ſame, but not with equal ſucceſs; which has convinced the world, that this kind of meaſure is inconſiſtent with the french tongue.

RHYPTICS, ῥυπτικα, in medicine, detergent remedies. See DETERGENTS.

RHYTHM, ῥυθμὸς, in muſic, the variety in the movement, as to the quickneſs or ſlowneſs, length or ſhortneſs of the notes. Or it may be defined more generally, the proportion which the parts of the motion have to each other. See the next article.

Ariſtides, among the antient muſicians, applies the word rhythmus three ways,

viz.




T. Jefferys sculp.

*viz.* either to immoveable bodies, when their parts are rightly proportioned to each other, as a well made ftatue, *&c.* Or to things that move regularly, as in dancing, in the dumb-fhews of pantomimes, *&c.* Or, thirdly, to the motion of found, or voice, in which the rhythmus confifts of fhort and long fyllables, or notes, joined together in fome kind of order, fo as their cadence on the ear may be agreeable. This, in oratory, is what we call numerous ftyle; and when the tones of the voice are well chofen, an harmonical ftyle. See STYLE.

In effect, rhythm, in general, is perceived either by the eye or ear, and may be either with or without metre; but the ftrict rhythm of mufic is only perceived by the ear, and cannot exift without it. The firft either exifts without found, as in dancing; or with founds. It may be either without any difference of acute and grave, as in a drum; or with a variety of thefe, as in a fong. The rhythm of the antients, Mr. Malcolm obferves, was very different from that of the moderns: the former was only that of the long and fhort fyllables of the words and verfes, and had no other forms or varieties than what the metrical art afforded. The changes therein are nothing but thofe made from one kind of metre to another, as from iambic to choraic, *&c.* In the modern mufic, the conftitution of the rhythm differs from that of the verfe fo far, that in fetting mufic to words, the thing chiefly regarded, is to accommodate the long and fhort notes to the fyllables in fuch a manner as that the words be well feparated, and the accented fyllables of each word fo confpicuous, that what is fung may be diftinctly underftood. See MELODY.

Voffius fays, the rhythm, which does not exprefs the very forms and figures of things, can have no effect; and that the antient poetical numbers alone are juftly contrived for this end. He adds, that the modern languages and verfe are altogether unfit for mufic; and that we fhall never have any right vocal mufic, till our poets learn to make verfes capable to be fung, *i. e.* till we new-model our language, reftore the antient quantities and metrical feet, and banifh our barbarous rhymes. Our verfes, fays he, run as it were all on one foot, fo that we have no real rhythm at all in our poetry: and adds, that we mind nothing farther than to have fuch a number of fyllables in a verfe, in whatever nature, and in whatever order.

RHYTHMICA, ῥυθμικη, in the antient mufic, that branch which regulated the rhythm. See the preceding article.

The rhythmica confidered the motions, regulated the meafures, order, mixture, *&c.* fo as to excite the paffions, keep them up, augment, diminifh, or allay them. Ariftides, and other antient mufical writers, divided artificial mufic into harmonica, rhythmica, and metrica. See the article MUSIC. But the rhythmica with them likewife comprehended dumb motions, and, in effect, all rhythmical, *i. e.* regular motions.

RHYTHMOPOEIA, one of the antient mufical faculties, as they are called, which prefcribes rules for motion, or rhythm.

The antient rhythmopoeia is very defective: we find nothing of it in their books but fome general hints, which can fcarce be called rules. In their explications, there appears nothing but what belongs to words and verfes of their fongs, which is a very ftrong prefumption they had no other. See RHYTHM, and the preceding article.

RIAL, or RYAL, a fpanifh filver-coin. See the article COIN.

RIAL, or ROYAL, is alfo the name of a piece of gold, antiently current among us for ten fhillings.

RIB, *cofta*, in anatomy. See RIBS.

RIBBAN, or RIBBON, in heraldry, the eighth part of a bend, like that reprefented in plate CCXXXII. fig. 8.

RIBBAND, or RIBBON, a narrow fort of filk, chiefly ufed for head-ornaments, badges of chivalry, *&c.*

In order to give our readers an idea of the manner in which this curious and valuable branch of manufacture is managed, we fhall prefent him with a view of the ribbon-weaver in his loom, as reprefented in plate CCXXXIII. fig. 5. where 1 is the frame of the loom. 2, The caftle, containing forty-eight pullies. 3, The branches, on which the pullies turn. 4, The tires, or the riding-cords, which run on the pullies, and pull up the high-liffes. 5, The lift-fticks, to which the high-liffes are tied. 6, The high-liffes, or lifts, are a number of long threads, with platines, or plate-leads, at the bottom; and ringlets, or loops, about their middle, through which the cords or crofs-threads of the ground-harnefs ride. 7, The plate-leads, or platines, are flat pieces

pieces of lead, of about ſix inches long, and three or four inches broad at the top, but round at the bottom; ſome uſe black ſlates inſtead of them: their uſe is to pull down thoſe liſſes, which the workman had raiſed by the treddle, after his foot is taken off. 8, The branches or cords of the ground-harneſs, which go through the loops in the middle of the high-liſſes: on the well ordering of theſe chords chiefly depends the art of ribbon-weaving, becauſe it is by means of this contrivance that the weaver draws in the thread or ſilk that makes the flower, and rejects or excludes the reſt. 9, The batton; this is the wooden-frame that holds the reed, or ſhuttle, and beats or cloſes the work: where obſerve that the ribbon-weaver does not beat his work; but as ſoon as the ſhuttle is paſſed, and his hand is taken away, the batton is forced by a ſpring from the top, to beat the work cloſe. 10, The ſhuttle, or reed. 11, The ſpring of the batton, by which it is made to cloſe the work. 12, The long-harneſs are the front-reeds, by which the figure is raiſed. 13, The linguas are the long pieces of round or ſquare lead, tied to the end of each thread of the long-harneſs, to keep them tight. 14, The broad piece of wood, about a foot ſquare, leaning ſomewhat forward, intended to eaſe the weaver, as he ſtoops to his ſhuttle; it is fixed in the middle of the breaſt-beam. Some weavers, inſtead of this, have a contrivance of a cord or rope, that is faſtened to the front-frame, and comes acroſs his breaſt; this is called a ſlopfall. 15, The ſeat-bench; this leans forwards very much. 16, The foot-ſtep to the treddles. 17, The breaſt-beam, being a croſs-bar that paſſes from one of the ſtandards to the other, ſo as to front the workman's breaſt: to this breaſt-bar is fixed a roll, upon which the ribbon paſſes in its way to be rolled upon the roller, that turns a little below. 18, The clamps, or pieces of wood, in which the broaches, that confine the treddles, reſt. 19, The treddles are long narrow pieces of wood, to the ends of which the cords, that move the liſſes, are faſtened. 20, The treddle-cords are only diſtinguiſhed from the riding-cords by a board full of holes, which divide them, in order to prevent the plate-leads, which are tied to the high-liſſes, from pulling them too high, when the workman's foot is off the treddle: which ſtop is made by a knot in the treddle-cord, too big to be forced through that hole in the board. 21, The lames are two pieces of thin narrow boards, only uſed in plain works, and then to ſupply the place of the long harneſs. 22, The knee-roll, by which the weaver rolls up his ribbon, as he ſees proper, or by bit and bit, as it is finiſhed. 23, The back-rolls, on which the warp is rolled. It is to be obſerved, that there are always as many rolls as colours in the work to be wove. 24, The clamps, which ſupport the rollers. 25, The returning-ſticks, or, as others call them, the returns, or the tumblers, or pullies, to which the tiers are tied, to clear the courſe of cords through the high-liſſes. 26, The catch-board, for the tumblers. 27, The tire-board. 28, The buttons for the knee-rolls and treddle-board, deſcribed in number 20.

Ribbands of all ſorts are prohibited to be imported.

Ribband-screw shell, a ſpecies of turbo, with broad ſpiral faſciæ, and a ſmall mouth. See the article Turbo.

RIBBLE, a river which riſes in the weſt-riding of Yorkſhire, and, running ſouth-weſt croſs Lancaſhire, falls into the Iriſh channel, below Preſton.

RIBES, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla whereof conſiſts of five ſmall, obtuſe, erect petals, inſerted into the margin of the cup: the fruit is a globoſe, umbilicated berry, containing only one cell, with two lateral, oppoſite, longitudinal receptacles; the ſeeds are numerous, roundiſh, and ſomewhat compreſſed.

This genus comprehends the currant, the black currant, and the purple gooſeberry.

RIBS, *coſtæ*, in anatomy, certain long arched bones, ſerving to form or ſuſtain the inner ſides of the thorax. See the article Thorax.

The ribs are twenty-four in number, twelve on each ſide; their figure is an imperfect ſegment of a circle; their ſize is very different, the middle ones being largeſt, and the upper and lower much ſmaller: they are harder, rounder, and more incurvated towards their articulations with the vertebræ, than at the other extremity towards the ſternum, which is thinner, broader, and more ſpongy. The ribs are diſtinguiſhed into true and ſpurious; the true ribs are the ſeven upper pair, which are thus diſtinguiſhed, as forming the moſt perfect arches, and as having a ſtrong articulation with the ſternum. The five lower are called nothæ, or ſpurious ribs,

ribs, as being ſmaller, ſhorter, and more cartilaginous than the reſt, and not reaching ſo far as the ſternum, which make their articulations very lax, in regard they terminate in long ſoft cartilages, which, bending upwards, are joined to the upper ribs. The ſeveral ribs have been diſtinguiſhed by many authors, each under its peculiar name; but this is not neceſſary, as they are as eaſily known by the names firſt, ſecond, *&c.* On the inſide of the true ribs, except the loweſt, and ſometimes the next to it, runs a pretty deep ſinus, reaching from the end next the ſpine, almoſt to its juncture with the cartilage. In the anterior extremities the cartilages of the ſeven true ribs are all joined to the ſternum; the eighth, ninth, and ſometimes the tenth, cohere either with the ſternum; or mutually adhere to one another, by means of their tranſverſe cartilages. The anterior extremities of all the others are looſe and free, between the muſcles of the abdomen and the diaphragm. In the poſterior extremities there are in moſt of them two capitulæ, or heads, which are firmly joined to the vertebræ of the back, yet ſo as to form moveable articulations; for the uſe of which, ſee the article RESPIRATION.

The ribs are liable both to fractures and luxations. In a ſlight fracture, the ſeparated bones are to be put into their places, a compreſs dipped in ſpirit of wine is to be laid on, and then covered with ſplints and a circular bandage. If any ſharp pieces of the ribs ſhould pierce the pleura, *&c.* it will be proper to open the ſkin, and extract the fragment. The ribs are but ſeldom diſlocated; but when this happens, they are to be replaced as ſoon as poſſible. See the articles FRACTURE and LUXATION.

RICCIA, in botany, a genus of the cryptogamia-algarum claſs of plants, conſiſting of a foliaceous matter, procumbent on the ground, on which there are evident male and female fructifications, ſometimes both on the ſame, and ſometimes on different plants of the ſame ſpecies; the male flower has neither calyx nor corolla, but conſiſts of a ſingle anthera, of an oblong tubulated form, which grows to the leaves, without any pedicle: the female flower has no corolla, and ſcarce any calyx, it conſiſts principally of a pericarpium of a globular figure, in which there are contained a number of ſeeds.

RICE, *oryza*, in botany and medicine. See the article ORYZA.

RICHARDIA, in botany, a genus of the hexandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle petal, of an infundibuliform ſhape; the limb is divided into ſix parts, erect and acute; there is no pericarpium; the ſeeds are three, roundiſh, angular on one ſide, broadeſt upwards, and gibbous.

RICHLIEU, a town of France, in the province of Orleanois and territory of Poictou, ſituated twenty-ſix miles north of Poictiers.

RICHMOND, a village in the county of Surry, ten miles weſt of London, formerly the reſidence of the kings of England.

RICHMOND is alſo a borough-town of Yorkſhire, thirty-three miles north-weſt of York.

It ſends two members to parliament.

RICINUS, in botany, a genus of the monoecia-polyadelphia claſs of plants, having no corolla, the fruit is a roundiſh triſulcated capſule, conſiſting of three valves, and containing three cells; the ſeed is ſingle, and of a roundiſh figure.

RICKETS, *rhachitis*, in medicine, a diſorder incident to children, proceeding from an unequal nutrition.

Children are ſeldom attacked with rickets before they are nine months old, and after they are two years old. It may originally proceed from the diſorders of the parents, and may be increaſed by thoſe of the nurſe. It is alſo promoted by feeding the child with aqueous and mucous ſubſtances, crude ſummer-fruits, fiſh, and too great a quantity of ſweet things; by ſitting too much, eſpecially in a perforated chair, with its coats up; by a ſtriking in of the itch, *&c.*

This diſorder is known from a flaccid tumour of the head and face, a flabby looſe ſkin, a ſwelling of the belly, and a falling away of the reſt of the other parts, eſpecially of the muſcles; from protuberances of the epiphyſes of the joints, ſuch as the wriſts, ancles, and knees; from the largeneſs of the jugular veins and arteries, while the reſt decreaſe; from knotty ribs, a narrow breaſt, and carious teeth, *&c.*

The cure, according to Boerhaave, is to be attempted with light, nouriſhing, dry aliment; not fat, but ſeaſoned, and taken often; with little ſound drink, ſuch as mild beer, or ale; with a dry warm air, and

and warm woolen clothing; with being carried about in the arms, or drawn in a vehicle over the ftones, and often fhook, fwung, and put in motion; with repeated frictions, efpecially of the belly and fpine of the back with warm dry flannel, fprinkled with aromatics; with gentle emetics, frequently tho' prudently repeated; with ftrengthening purges for feveral days fucceffively; and with cold bathing, the child being put to fweat between blankets every day, as foon as he comes out of the water.

Particularly for food, the bread fhould be bifcuit, with a little faffron and fpices; the flefh fhould be pigeons, pullets, veal, rabbits, mutton gently roafted, minced and mixed with bifcuit, falt, a little parfley, thyme, nutmeg, or the like. He may alfo eat rice, millet, or pearl barley, boiled with raifins, to which add a little wine and fpice. The drink may be red wine, of which an ounce may be given three or four times a day; as alfo brunfwic mum and englifh beer, which, in the fummer, may be mixed with fpaw-water. Let the pillow and bed be filled with the following leaves dried in the fhade, *viz.* of male fern, three pounds; of marjoram, baum, and mint, each two handfuls; and of the flowers of melilot, fweet-trefoil, elder and rofes, dried in the fhade, of each two ounces: reduce them all to powder, and mix them with double the quantity of barley-chaff.

RIDE, in the fea-language, is a term varioufly applied: thus, a fhip is faid to ride, when her anchors hold her faft, fo that fhe does not drive, by the force either of the wind or tide. A fhip is faid to ride acrofs, when fhe rides with her fore and main yards hoifted up to the hounds, and both yards and arms topped alike. She is faid to ride well, when fhe is built fo as not to over-beat herfelf in a head-fea, the waves over-raking her from ftem to ftern. To ride athwart, is to ride with her fide to the tide. To ride betwixt wind and tide, is to ride fo as the wind has equal force over her one way, and the tide the contrary way. If the wind has more power over the fhip than the tide, fhe is faid to ride wind-road, or to ride a great wind. And fhe is faid to ride a-portoife, when the yards of a fhip are ftruck down upon the deck. For to ride hawfefull, a-peek, or land-locked, fee HAWSES, PEEK, and LAND.

RIDE, of hazel, or other wood, is a clufter of fprigs fhooting out from the fame root.

RIDEAU, in fortification, is a fmall elevation of earth, extending lengthwife on a plane, and ferving to cover a camp, or to give an advantage to a poft. Rideaus are alfo convenient for thofe who would befiege a place, and ferve to fecure the workmen in their approaches to the foot of a fortrefs.

Rideau is alfo ufed fometimes for a trench, the earth of which is thrown upon its fides, to ferve as a parapet for covering the men.

RIDER, a term ufed for an after-claufe added to a bill, while depending in parliament.

RIDER-ROLL. See the article ROLL.

RIDERS, in a fhip, are large timbers, both in the hold and aloft, bolted on to other timbers to ftrengthen them, when the fhip is difcovered to be too flightly built.

*Out* RIDERS. See OUT-RIDERS.

RIDGE, in agriculture, a long piece of rifing land, between two furrows.

Mr. Tull obferves, that the method of ploughing lands up into ridges is a particular kind of tillage, the chief ufe of which is the alteration it makes in the degrees of heat and moifture. But the principal advantage this gentleman propofes from ridges is the draining wet hills, where the upper ftratum is mould, and the fecond ftratum clay. Thefe ridges, he obferves, fhould be plowed acrofs the hill, almoft horizontally, that their parting furrows lying open, may each ferve as a drain to the ridge next below it; for when the plough has made the bottom of thefe horizontal furrows a few inches deeper than the furface of the clay, the water will run to their ends very fecurely, without rifing into the mould, provided no part of the furrows be lower than their ends. Thefe ridges and their parting furrows muft be made more or lefs oblique, according to the form and declivity of the hill; but the more horizontal they are, the fooner the rain-water will run off the lands: for in that cafe, it will run to the furrows, and reach them at right angles. Every one of thefe horizontal trenches receives all the water from the rills, or little gutters, which in thefe quagmire-hills, run betwixt the mould and the clay; thefe are all cut off by the trenches, which receive the water at their upper fides, and carry it away, as the gutters of lead, placed under the eaves

eaves of a houfe, carry away the rain-water.

Thefe ridges fhould be plowed in pairs, without throwing any earth into the trenches; and at every time of plowing, the pairs muft be changed, fo that the furrow which had two ridges turned towards it one time, muft have two turned from it the next.

RIDGE, in building, the higheft part of the roof or covering of a houfe.

RIDGES *of a horfe's mouth*, are wrinkles or rifings of flefh in the roof of the mouth, running a-crofs from one fide of the jaw to the other, with furrows between them. On the third or fourth of thefe ridges the farriers ftrike with a horn, in order to bleed a horfe, whofe mouth has been over-heated.

RIDGLING, or RIDGEL, among farriers, *&c.* the male of any beaft that has been but half gelt.

RIDICULE, in matters of literature, is that fpecies of writing, which excites contempt with laughter.

The objects of ridicule are falfhood, incongruity, impropriety, or turpitude of certain kinds: but as the object of every excited paffion muft be examined by reafon, before we can determine whether it be proper or improper; fo ridicule muft, apparently at leaft, eftablifh the truth of the improprieties, defigned to excite the paffion of contempt. Hence, it comes in to the aid of argument and reafon, when its impreffions on the imagination are confiftent with the nature of things; but when it ftrikes the fancy and affections with fictitious images, it becomes the inftrument of deceit. But however ridicule may imprefs the idea of apparent turpitude, or falfhood, in the imagination; yet ftill reafon remains the fupreme judge: and thus ridicule can never be the final teft or touch-ftone of truth and falfhood, as has been obferved by lord Shaftefbury.

RIDING, a divifion of Yorkfhire, of which there are three, *viz.* the eaft, weft, and north ridings.

In all indictments in that county, both the town and riding muft be expreffed.

RIDING CLERK, one of the fix clerks in chancery, who, in his turn, annually keeps the controlment-books of all grants that pafs the great feal that year.

RIENS ARREAR, in law, is a plea ufed in an action of debt, for arrearages of accounts, by which the defendant alledges, that there is nothing in arrear.

RIENS PASSE PAR LE FAIT, NOTHING PASSES BY THE DEED, is the form of an exception, in fome cafes taken to an action. See the article EXCEPTION.

RIENS PAR DESCENT, NOTHING BY DESCENT, is the plea of an heir, fued for his anceftor's debt, though he has no lands from him by defcent, nor affets in his hands. See the article DESCENT.

RIER, or REER-COUNTY, in law, is oppofed to full and open county, and, in our ftatutes, is taken to be fome public place appointed by the fheriff, for the receipt of the king's money, after the end of the county-court.

RIES, a town of Provence, in France, twenty-feven miles north-eaft of Aix.

RIETI, a town of Italy, in the territory of the pope and dutchy of Spoletto, fixty-three miles eaft of Rome.

RIEUX, a town of France, in the province of Languedoc, twenty-two miles fouth of Touloufe.

RIGA, a port-town of Livonia, one of the beft harbours and trading towns in the Baltic: eaft long. 24°, north lat. 57°.

RIGADOON, a gay and brifk dance, borrowed originally from Provence in France, and performed in figure, by a man and a woman.

RIGEL, the fame with regel. See the article REGEL.

RIGGING *of a fhip*, is all her cordage and ropes, belonging to her mafts, yards, *&c.* See the articles SHIP, ROPE, CORDAGE, *&c.*

A fhip is faid to be well rigged, when all her ropes are of a fit fize and proportion: and fhe is faid to be over-rigged, when her ropes are too large; which is of great prejudice to her failing, and is apt to make her heel.

RIGHT, in geometry, fignifies the fame with ftraight: thus, a ftraight line is called a right one. See LINE.

As for right angle, right afcenfion, right cone, right defcenfion, right fine, right fphere, *&c.* they are explained under the articles ANGLE, ASCENSION, *&c.*

RIGHT, *jus*, in law, not only denotes property, for which a writ of right lies, but alfo any title or claim, either by virtue of a condition, mortgage, *&c.* for which no action is given by law, but an entry only. See the articles JUS, ENTRY, PROPERTY, *&c.*

By ftat. 1 Will. & Mar. cap. ii. the following particulars relating to the ill conduct of king James II. were declared to be illegal, and contrary to the antient

rights and liberties of the people, *viz.* his exercifing a power of difpenfing with, and fufpending, of laws; his levying money without confent of parliament; violating the freedom of elections; caufing partial and corrupt jurors to be returned on trials, exceffive bail to be taken, and exceffive fines to be impofed, as well as cruel punifhments to be inflicted, *&c.*

RIGIDITY, in phyfics, denotes a brittle hardnefs. See the article HARDNESS.

It is oppofed to ductility, malleability, and fofinefs. See DUCTILITY, *&c.*

RIGLET, or REGLET. See REGLET.

RIGNANO, or REGUANO, a town of Italy, in the territories of the pope and St. Peter's patrimony, fifteen miles north of Rome.

RIGOL, a kind of mufical inftrument, confifting of feveral fticks bound together, only feparated by beads. It makes tolerable mufic, on being well ftruck with a ball at the end of a ftick.

RIGOR, in medicine, a convulfive fhuddering, from fevere cold, an ague-fit, or other diforder.

RIM, in a watch, or clock, the edge or border of the circumference or circular part of a wheel.

RIME, or RHYME, in poetry. See the article RHYME.

RIMINI, a port-town of Italy, in the territories of the pope, and province of Romania, fituated on the gulph of Venice: eaft long. 13° 30′, and north lat. 44° 8′.

RIND, the fkin of any fruit that may be cut off or pared.

The outer coat of the chefnut, fet with prickles, is particularly termed the urchin-like rind.

Rind is alfo ufed for the inner bark of trees or that whitifh foft fubftance which adheres immediately to the wood.

In the modern theory of vegetation, the fap is fuppofed to pafs through the rind, in its return from the extremities of the branches to the root. Others fuppofe its veffels to do the office of arteries, whence Mr. Bradley calls them arterial veffels.

RING, an ornament of gold, filver, *&c.* made of a circular form, and generally worn on the finger. That worn by the antient roman knights is reprefented in plate CCXXXIII. fig. 2.

Nuptial or wedding rings were ufed by the antient Greeks and Romans; and from them the chriftians took them up very early, as appears from Tertullian, and fome antient liturgies, where we find the form of bleffing the nuptial ring. See MARRIAGE and NUPTIAL RITES.

The epifcopal ring is alfo of very antient ftanding; it makes a part of the pontifical apparatus, and is efteemed a pledge of the fpiritual marriage between the bifhop and his church.

There is fcarcely any part of the body on which rings have not been worn. In India, the people commonly wear them on the nofe, lips, cheeks, and chin. As to the ears, the cuftom ftill obtains of wearing rings in them, both by men and women, throughout the greateft part of the world. When Peter Alvarez had his firft audience of the king of Calicut, he found him covered with ftones fet in rings, both in his hands, fingers, feet, and toes: and Louis Bartome reprefents a king of Pegu with precious ftones on every toe.

Rings have been alfo ufed as feals. See the article SEAL.

RING, in navigation and aftronomy, a brafs-inftrument, made in the form of a ring, and ferving to take altitudes of the fun. See plate CCXXXIII. fig. 1.

At C is a fmall hole, in the direction C D, which is perpendicular to C E; this hole is precifely 45° from A, and C E is parallel to the vertical diameter A B. From C, as a center, they defcribe a quadrant of a circle C E D; which being nicely divided into 90°, they mark upon the internal furface of the ring the places where rays, drawn from C, to thefe degrees, cut the faid furface.

To ufe this ring, they hold it up by the fwivel, and turn the fide with the hole C, towards the fun; and then the fun-beams paffing through the hole, make a luminous fpot among the degrees, whereby the altitude is found. Some prefer the ring to the aftrolabe, by reafon its divifions are larger: however, it is far from being exact enough to be much depended on in aftronomical obfervations, which are better made by quadrants See ASTROLABE and QUADRANT.

RING-BONE, in farriery, a hard callous fubftance, growing in the paftern of a horfe, above the coronet: it is thus called from it growing quite round like a ring.

RING-DIAL. See the article DIAL.

RING-OUZEL, in ornithology, a fpecies of black turdus, with a white ring, a little larger than the common black-bird. See the article TURDUS.

RING-WORM, in medicine, the fame with the ferpigo. See the article SERPIGO.

*Fairy*-RING, or CIRCLE. See the article FAIRY-RING.

*Saturn's* RING, in aftronomy. See the article SATURN.

RINGWOOD, a market-town of Hampfhire, twenty-five miles fouth-weft of Winchefter.

RIO GRANDE, a river of Terra Firma, which rifing almoft under the equator, and running north, falls into the north fea between Carthagena and St. Martha.

RIO GRANDE is alfo a river of Africa, which runs from eaft to weft through Negroland, and falls into the Atlantic ocean, in 11° north latitude.

RIO JANEIRO, a river of fouth America, which rifes in the mountains weft of Brazil, and falls into the Atlantic ocean almoft under the tropic of capricorn.

RIONDO, in ichthyology, a fpecies of red zeus, with an even tail, and the roftrum turned upwards. See ZEUS.

RIOM, a town of the Lionois, in France, feven miles north of Clermont.

RIOT, in law, is where three or more perfons, affembled together, commit fome unlawful act, with force and violence, to the difturbance of the peace; as beating fome perfon, forcibly entering upon the poffeffion of the lands, houfes, *&c.* of another, or breaking down inclofures, houfes, *&c.*

By ftat. 1 Geo. I. cap. v. if any perfons to the number of twelve or more, unlawfully and riotoufly affembled, continue together for an hour, after being required, by a juftice of the peace, or other magiftrate, to difperfe, they fhall be deemed guilty of felony without benefit of clergy. However, profecutions upon this ftatute, muft be begun within one year after the offence is committed.

RIPAILLE, a town of Savoy, fituated on the fouth fide of the lake of Geneva, twenty miles north-eaft of that city.

RIPEN, a city and port-town of north Jutland, fubject to Denmark.

RIPENERS, in furgery, medicines that promote fuppuration, otherwife called fuppuratives. See SUPPURATIVES.

RIPPON, a borough-town of Yorkfhire, twenty-one miles north-weft of York.

It fends two members to parliament.

RISING, *ortus*, in aftronomy, the appearance of the fun, a ftar, *&c.* above the horizon of any place.

There are three kinds of poetical rifing of the ftars, *viz.* acronychal, cofmical, and heliacal. See ACRONYCHAL, *&c.* The heavenly bodies always appear above the horizon before they really arrive at it, on account of refraction. See the article REFRACTION.

RISK, or HAZARD, in gaming, *&c.* See the articles CHANCE, HAZARD, *&c.*

RITE, *ritus*, among divines, denotes the particular manner of celebrating divine fervice, in this or that country. See the article RITUAL.

RITORNELLO, or REPEAT, in mufic, the burden of a fong, or the repetition of the firft or other verfes of a fong at the end of each ftanza or couplet.

Cuftom has extended the ufe of the word to all fymphonies played before the voices begin; and which ferve by way of prelude to what follows.

In the partitions of the fcore of the italian mufic, we frequently find the ritornellos fignified by the words *fi fuona*, to fhew that the organ, fpinet, harpfichord, or the like, are to repeat fome bars of what the voice has been finging. See the article REPETITION.

RITUAL, a book directing the order and manner to be obferved in celebrating religious ceremonies, and performing divine fervice in a particular church, diocefe, order, or the like.

The antient heathens had alfo their rituals, which contained their rites and ceremonies to be obferved in building a city, confecrating a temple or altar, in facrififing, deifying, *&c.*

RIVA, a city of Italy, at the north end of the Lake de Garda, fixteen miles fouth weft of Trent.

RIVADEC, a city and port of Spain, in the province of Galicia; weft long. 7°, 10′, north lat. 43° 36′.

RIVAL, a term applied to two or more perfons, who have the fame pretenfions, and which is properly applied to a competitor in love, and figuratively to an antagonift in any other purfuit.

RIVER, *fluvius*, or *flumen*, a current, or ftream of frefh water flowing in a bed or channel, from its fource into the fea. See the article SPRING.

The great, as well as the middle-fized rivers, proceed either from a confluence of brooks and rivulets, or from lakes; but no river of confiderable magnitude flows from one fpring, or one lake, but is augmented by the acceffion of others. Thus the Wolga receives above two hundred

hundred rivers and brooks before it difcharges itfelf into the Cafpian Sea; and the Danube receives no lefs, before it enters the Euxine Sea. Some rivers are much augmented by frequent rains, or melted fnow. In the country of Peru, and Chili, there are fmall rivers, that only flow in the day; becaufe they are only fed by the fnow upon the mountains of the Andes, which is then melted by the heat of the fun. There are alfo feveral rivers upon both fides the extreme parts of Africa, and in India, which for the fame reafon are greater by day than by night. The rivers alfo in thefe places are almoft dried up in fummer, but fwell and overflow their banks in winter, or in the wet feafon. Thus the Wolga in May and June is filled with water, and overflows its fhelves and iflands, though at other times of the year it is fo fhallow, as fcarcely to afford a paffage for loaded fhips. The Nile, the Ganges, the Indus, *&c.* are fo much fwelled with rain or melted fnow, that they overflow their banks; and thefe deluges happen at different times of the year, becaufe they proceed from various caufes. Thofe that are fwelled with rain, are generally higheft in winter, becaufe it is ufually then more frequent than at other times of the year; but if they proceed from fnow, which in fome places is melted in the fpring, in others, in fummer, or between both, the deluges of the rivers happen accordingly. Again, fome rivers hide themfelves under ground, and rife up in other places, as if they were new rivers. Thus the Tigris meeting with mount Taurus, runs under it and flows out at the other fide of the mountain: alfo, after it has run thro' the lake Tofpia, it again immerges, and being carried about eighteen miles under ground, breaks out again, *&c.*

The channels of rivers, except fuch as were formed at the creation, Varenius thinks, are artificial. His reafons are, that, when a new fpring breaks out, the water does not make itfelf a channel, but fpreads over the adjacent land; fo that men were neceffitated to cut a channel for it, to fecure their grounds. He adds, that a great number of channels of rivers are certainly known from hiftory to have been dug by men.

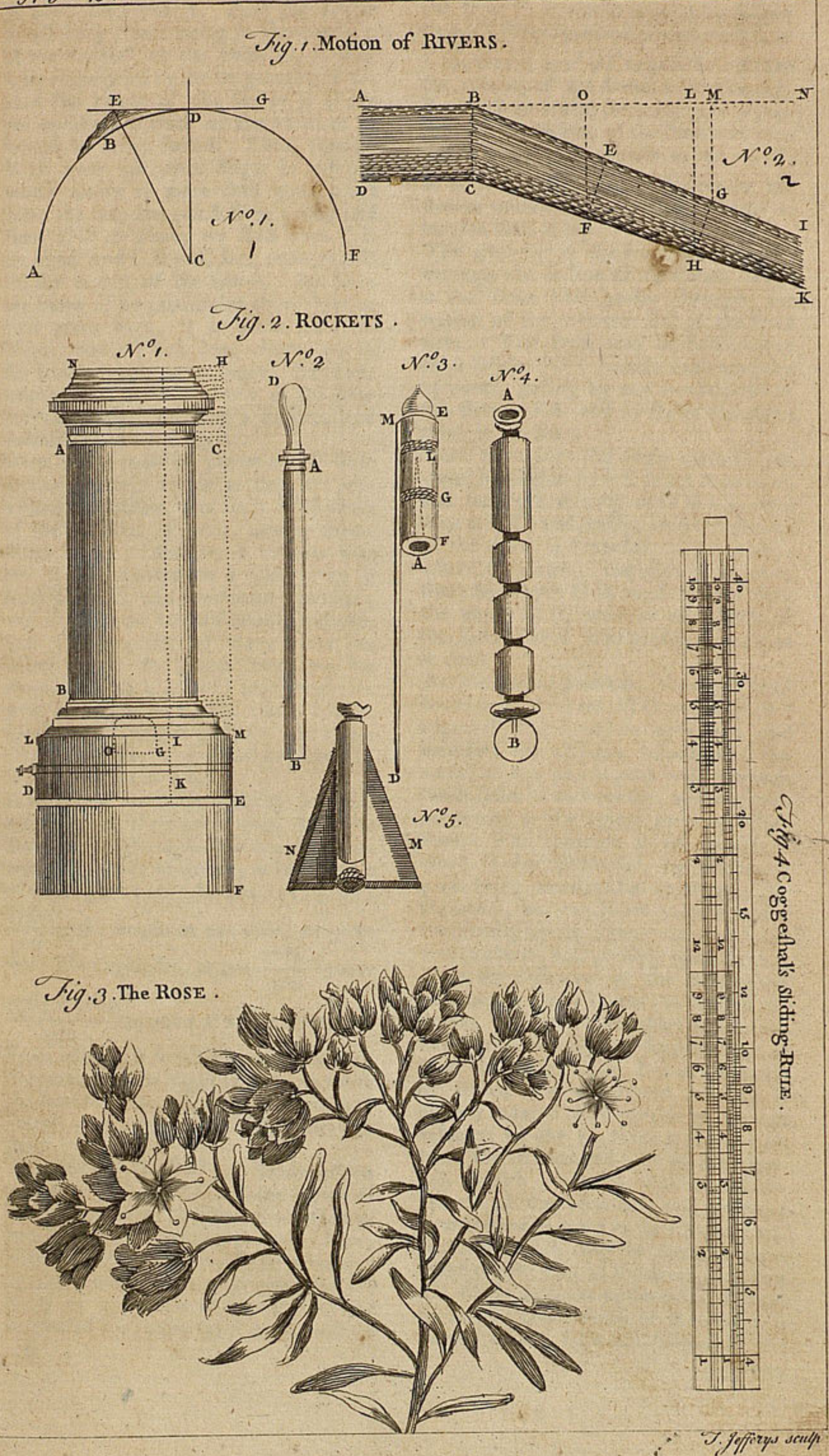
The water of moft rivers flow impregnated with particles of metals, minerals, *&c.* Thus fome rivers bring fands intermixed with grains of gold; as in Japan, Peru, and Mexico, Africa, Cuba, *&c.* particularly in Guinea is a river, where the negroes feparate the gold-duft from the fand, and fell it to the Europeans, who traffic thither for that very purpofe. The Rhine in many places is faid to bring a gold mud. As to rivers that bring grains of filver, iron, copper, lead, *&c.* we find no mention of them in authors; though, doubtlefs there are many, and it may be to them that mineral waters owe many of their medicinal virtues. See MINERAL.

*Theory of the motion of* RIVERS. The running of rivers is upon the fame principle as the defcent of bodies on inclined planes; for water no more than a folid can move on an horizontal plane, the re-action of fuch a plane being equal and contrary to gravity, entirely deftroys it, and leaves the body at reft: here we fpeak of a plane of fmall extent, and fuch as coincides with the curved furface of the earth. But if we confider a large extent or long courfe of water, then we fhall find that fuch water can never be at reft, but when the bottom of the channel coincides every where with the curved furface of the earth.

Let ADF (plate CCXXXIV. fig. 1. n° 1.) be the curved furface of the earth, C its center, CD, CE two right lines drawn from thence, and EG a tangent to the earth in the point D. Then it is plain if BD were a channel of water, the water could not run, or move, becaufe they are every where at an equal diftance from the center C, and therefore equally affected by gravity. But if there be any place above the furface of the earth, as E, where water can be found, 'tis evident that water can defcend in a channel to any part of the earth's furface, between B and D, becaufe every point in the line ED is nearer to the center of the earth, and therefore below the point or place E; and its velocity will be fo much the greater as it tends to a point nearer B, and floweft of all, when it moves in the direction of the tangent ED. See the article FLUID.

Hence it appears that the fource E of all rivers and ftreams muft be more than a femi-diameter of the earth CB diftant from the center C. And fince all great rivers run to the fea or ocean where they difembogue their waters at the point D, the line DC is a femi-diameter, and

= 4000




T. Jefferys sculp.

= 4000 miles nearly. Alfo the courfe of all long rivers being in the direction of the tangent at the point D, if they were reprefented by the tangent-line E G, then the height of the fource E above the common furface of the earth at B would be eafily found. Thus, fuppofe E D were the river Niger in Africa, whofe fource is more than 3000 miles from the fea; but put E D = 3000, and fince C D = 4000, we fhall have C E = 5000, and C E — C B = 1000 = B E = the height of the fource. But fince we know of no mountains above three or four miles high, it is plain the river Niger, and all fuch long rivers, are fo far from moving in a tangent, that their courfe muft be very nearly of the fame curvature with the earth's furface, and infenfibly diftant from it.

Since bodies move on planes ever fo little inclined, except fo far as they are prevented by friction, and fince the friction of the particles of water among themfelves is inconfiderable, it follows that the water fituated on a plane ever fo little inclined, will commence a motion; and if the plane be confiderably inclined, and the quantity of water great, its velocity will be proportional, and its momentum fuch as will foon begin to wear away the earth, and create itfelf a courfe or channel to glide in. In rivers that are made, it is ufual to allow the fall of one foot in 300.

If we allow the fame declivity to rivers which make their own way, then we find their height at their fource above the common furface of the fea, as in example of the Niger thus: As 300 : 1 : : 5280 : $\frac{5280}{300}$ = the height at one mile, or 5280 feet. Then again fay, as 1 : $\frac{5280}{300}$ : : 3000 : $\frac{5280 \times 3000}{300} = 5280 \times 10 = 10$ miles.

From whence it is evident, that the continents and iflands ought to be much above the furface of the fea, to give a neceffary defcent and courfe to the waters through them.

Let A B C D (*ibid.* n° 2.) be the fection of a refervoir, and B C I K the fection of a canal of water fupplied from thence, and A B N the horizontal line. Now, fince the particles of water are governed by the common laws of gravity, the velocity of a particle at any part of the bottom of the canal, as F or H, will be the fame as it would acquire by falling through the perpendicular altitude O F or L H, that is, as $\sqrt{OF}$ to $\sqrt{LH}$. Hence the velocity of the ftream is accelerated. For the fame reafon the velocity of a particle at the bottom of the ftream H is to the velocity of a particle at the top G, as $\sqrt{LH}$ to $\sqrt{MG}$; confequently the ftream moves with greater celerity at bottom than at top.

The quantity of the water which paffes through the fection of the ftream H G, is the fame that paffes through the fection of the refervoir B C in the fame time. The fame may be faid of any other fection F E; therefore the quantity of water, paffing by any two fections of the ftream F E and G H, in the fame time, is the fame.

Since there runs the fame quantity of water by G H as by F E in the fame time; and fince the velocity at G H is greater than at F E; and, laftly, fince the breadth of the canal is fuppofed to be everywhere the fame; therefore it follows, that the depth G H muft be lefs than the depth F E, and fo the depth of the ftream muft continually decreafe as it runs.

As the ftream proceeds, the depth H G decreafing, the lines M G and L H will approach nearer to an equality; and therefore the different velocities of the water at top and bottom will approach much fafter to an equality, as being proportionate to the fquare roots of thofe lines. This approach to an equality is much farther promoted, by the upper parts being continually accelerated by the lower, and the lower parts retarded continually by the flower motion of the waters above, and preffing upon them.

Since the difference of the defcending velocities is greateft near the head of the ftream, the waters will there fall or defcend with the greateft impetuofity, or caufe the loudeft noife. But in the courfe of rivers, the accelerated velocity is quickly reduced to an equable or uniform velocity, by the refiftance it meets with from the bottom and fides of the channel, which refiftance will be as the fquares of the velocities, and therefore foon become fo great as to equal the accelerating force, and be communicated to the middle part of the ftream, caufing the whole to move uniformly. Hence, in rivers, the motion of the water is floweft at the fides and bottom of the channel,

channel, becaufe there the refiftance begins, which is afterwards communicated to all the other parts; and in different parts of the fame river, the uniform velocity is greateft, where the bottom of the channel has the greateft inclination, or declivity, becaufe the relative gravity of the moving particles is here greateft. Again, in thofe parts of the river where the velocity of the ftream is leaft, the depth of the water is greateft, and vice verfa, becaufe equal quantities pafs thro' unequal fections of the river in the fame time. Hence alfo it follows, that the momentum of running water muft be every where the fame, or a given quantity.

RIVINIA, or RIVINA, in botany, a genus of the tetrandria-monogynia clafs of plants, without any flower petals: the fruit is a globofe berry, containing a fingle roundifh and compreffed feed.

RIVULET, a diminutive of river. See the article RIVER.

RIX-DOLLAR, a filver-coin, current in different parts of Europe. See COIN.

ROACH, in ichthyology, a fpecies of cyprinus, with the iris and belly-fins ufually red: it is generally, when full grown, nine inches long, but it fometimes grows confiderably larger. See the article CYPRINUS.

ROACHING *of alum*, is the laft procefs in making of alum, which, being fufficiently wafhed in a ciftern of ftrong alum-water, is put into large pans, and a quantity of water added to it; and then being fet over the fire to melt, and boil a little, it is fcooped into a great cafk, where it is fuffered to ftand and cryftalize, and is what they call roach, roached, or rock alum. See ALUM.

ROAD, an open way, or public paffage, forming a communication between one place and another.

Of all the people in the world the Romans took the moft pains in forming roads, and the labour and expences they were at in rendering them fpacious, firm, ftrait, and fmooth, is incredible. They ufually ftrengthened the ground by ramming it, laying it with flints, pebbles or fand, and fometimes with a lining of mafonry, rubbifh bricks, &c. bound together with mortar. In fome places in the Lionois, F. Meneftrier obferves, that he has found huge clufters of flints cemented with lime, reaching ten or twelve feet deep, and making a mafs as hard and compact as marble, and which, after refifting the injuries of time for 1600 years, is ftill fcarce penetrable by all the force of hammers, mattocks, &c. and yet the flints it confifts of are not bigger than eggs. The moft noble of the roman roads was the Via Appia, which was carried to fuch a vaft length, that Procopius reckons it five days journey to the end of it, and Leipfius computes it at 350 miles: it it twelve feet broad, and made of fquare free-ftone, generally a foot and a half on each fide; and though this has lafted for above 1800 years, yet in many places it is for feveral miles together as intire as when it was firft made.

The antient roads are diftinguifhed into military roads, double roads, fubterraneous roads, &c. the military roads were grand roads, formed by the Romans for marching their armies into the provinces of the empire; the principal of thefe roman roads in England, are Watling-ftreet, Ikenild-ftreet, Fofs-way, and Erminage-ftreet. Double roads among the Romans, were roads for carriages, with two pavements, the one for thofe going one way, and the other for thofe returning the other: thefe were feparated from each other by a caufeway raifed in the middle, paved with bricks for the conveniency of foot paffengers; with borders and mounting ftones from fpace to fpace, and military columns to mark the diftance. Subterraneous roads are thofe dug through a rock, and left vaulted; as that of Puzzoli near Naples, which is near half a league long, and is fifteen feet broad, and as many high.

For the englifh roads, fee the article HIGHWAY.

ROAD, in navigation, is a place of anchorage at fome diftance from fhore, where veffels ufually moor, to wait for a wind or tide proper to carry them into harbour, or to fet fail.

When the bottom is firm, clear of rocks and fheltered from the wind, it is called a good road; and when there is but little land on any fide, it is termed an open road.

The roads in his majefty's dominions are free to all merchant veffels, belonging to his fubjects and allies. Captains and mafters of fhips who are forced by ftorms, &c. to cut their cables, and leave their anchors in the roads, are obliged to fix marks or buoys, on pain of

forfeiting

forfeiting their anchors, &c. Masters of ships coming to moor in a road, must cast anchor at such a distance, as that the cables, &c. do not mix, on pain of answering the damages; and when there are several vessels in the same road, the outermost to the sea-ward is obliged to keep a light in his lanthorn in the night-time, to apprise vessels coming in from sea.

ROADER, among sailors, a ship that rides at anchor in a road.

ROAN. See the article ROUEN.

ROANE, a town of France, in the province of Lionois, forty miles north-west of Lyons.

ROANOAK, an island in North America, near the coast of Albemarle-county, in North Carolina: west long. 75°, north lat. 35° 40′.

ROASTING, in metallurgy, the separation of volatile bodies from those which are more fixed, by the combined action of air, and fire; and is generally the first process in the separation of metals from their ores: it differs from sublimation only in this, that in this operation the volatile parts are dissipated, when resolved into vapours; whereas in that, they are preserved. See SUBLIMATION. Sulphur and arsenic are in this manner collected, and preserved, in the roasting of many ores; and sublimation made, as it were, occasionally in the process.

The separation of the volatile parts of bodies, from the more fixed is, however, in many cases very difficult, and much nicety is required in the conducting this operation; this is the case, for instance, when the whole compound body melts in almost the same degree of fire that is necessary to raise, and dissipate the volatile parts in the air; in such cases, care must be taken, first previously to pound a little the body to be roasted, that its surface contiguous to the air may be increased in extent. A gentle fire is also necessary on such occasions, and a very free access of the air, which is the vehicle of these vapours. When the body in the roasting grows on these occasions into large lumps or clots, the surface of it must be restored to the necessary extent, by repeated poundings, for it is necessary above all things, that the matter be kept extended and recent, and never collected into a heap.

Roasting, as commonly practised, is subject to many inconveniencies, which may be most of them easily remedied, and the whole business reduced to a few easy rules. 1. The roasting of ores should be always performed, without addition, when the ores are rich, or of itself merely of a metallic nature. But the additions of quicklime, potashes, iron-filings, and the like, are necessary, when arsenical, antimonial and sulphureous matters are found to be mixed with the ores. 2. The fire is to be so regulated from the first, that only the lighter or more volatile sulphureous or arsenic fumes may fly off, otherwise the more metallic part would likewise go, and without some contrivance to catch it would be lost. The ore must, however, always feel the force of an open flame, otherwise the sulphur, arsenic, &c. will never be thoroughly dislodged. 3. The more these immature substances abound in ore, the gentler the fire should be at first; and when the greater part of the sulphureous matter is thus exhaled, the fire is then to be quickened. 4. Where such additions are used, as are not metalline, as lime, mud, pot-ash, &c. they ought always to be separated afterwards from the matter before the fusion, by washing.

ROB, in pharmacy, the juices of fruits purified and inspissated till it is of the consistence of honey.

Rob of alderberries is thus prepared: Take two quarts of the juice of ripe alderberries, and half a pound of refined sugar. Evaporate over a gentle fire, or in a water-bath, till it is of a due consistence.

ROBBERY, in law, a felonious taking away another man's goods, from his person, presence, or estate, by putting him in fear.

Robbery on the highway, is felony without benefit of clergy, though the sum or value taken be under twelve-pence, or even be no more than a single penny: but if any thing be taken from the person of another without putting him in fear, this is properly no robbery, but felony, in which benefit of clergy is allowed; the putting in fear being the chief article that distinguishes robbery from stealing from a man's person.

In the case of robberies, there is therefore, a taking in deed, which is the very act; and a taking in law, as where a robber compels a man, from the fear of death, to swear he will bring him a sum of money, which the sworn person de-

livers to the other. The ſtreets in cities are made highways, in reſpect to robberies, by 6 Geo. I. Perſons who aſſault, or in a forcible manner demand money of another, with an intent to commit a robbery, are guilty of felony, and are to be tranſported for ſeven years.

The hundred in which a robbery on the highway is committed, is liable to pay the damage, when it is committed between the riſing and ſetting of the ſun, in any day, except Sunday, in caſe the robbers are not taken in forty days; hue and cry being made after the robber. And he who apprehends and proſecutes a robber on the highway, ſo as to convict him, is intitled to receive of the ſheriff of the county where the robbery was committed, the ſum of 40 l. with the horſe, furniture, arms, *&c.* upon ſuch perſon's producing a proper certificate from the judge before whom the robber was convicted.

*Houſe*-ROBBING. See the article HOUSE-BREAKING.

ROBE, a garment of ſtate, being a kind of gown, which hangs looſe, and covers the whole body.

*Maſter of the* ROBES. See the article MASTER *of the Wardrobe*.

ROBERVALLIAN LINES, certain lines uſed for the tranſmutation of figures, and ſo called from their inventor M. de Roberval.

ROBIGALIA, or RUBIGALIA. See the article RUBIGALIA.

ROBINIA, in botany, a genus of the diadelphia-decandria claſs of plants, with a papilionaceous flower; its fruit is a large and long pod, of a compreſſed and gibboſe ſhape, and containing a few kidney-ſhaped ſeeds.

ROBORANTS, *roborantia*, in pharmacy, medicines which ſtrengthen the parts, and give new vigour to the conſtitution. See the article STRENGTHENERS.

ROCAMBOLES, in cookery, a mild kind of garlic, by ſome called ſpaniſh garlic. See the article GARLIC.

ROCELLA, in commerce, *&c.* the ſame with the alga tinctoria, uſed by the dyers for a purple colour. See the article ALGA.

ROCHDALE, a market-town, thirty two miles ſouth eaſt of Lancaſter.

ROCHEFOUCAUT, a town of Orleanois, in France, fifteen miles eaſt of Angouleſme.

ROCHELLE, a city and port town of Orleanois, in France: weſt long. 1° 5′, north. lat. 46° 7′.

ROCHESTER, a city of Kent, ſituated on the river Medway, thirty miles eaſt of London, and twenty-two weſt of Canterbury.

Rocheſter bridge, over the Medway, makes a fine appearance, having an iron palliſade running its whole length on each hand.

ROCHFORD, a market-town of Eſſex, thirty-three miles eaſt of London, and fifteen ſouth-eaſt of Chelmsford.

ROCHFORT, a port-town of Guienne, in France, twenty-three miles ſouth of Rochelle: weſt long. 1°, north lat. 46°. It is one of the ſtations of the french navy, having a commodious harbour, well ſecured by forts and batteries.

ROCK, *rupes*, a large maſs or block of hard ſtone rooted in the ground. See the article STONE.

ROCK-*alum*. See the article ALUM.

ROCK-*cryſtal*, otherwiſe called ſprig-cryſtal, in natural hiſtory, a name given to the third order of cryſtals, from their being affixed to a rock, or other ſolid body.

This kind of cryſtal is the moſt common of all others, and is what the generality of authors deſcribe under the name of cryſtal of the ſhops, being that kept for medicinal purpoſes. See CRYSTAL.

The cleareſt, pureſt, and moſt tranſparent that can be had, ought to be choſen; and to prove its genuineneſs, it may be tried with aqua fortis, true cryſtal making no efferveſcence with that menſtruum.

ROCK-*fiſh*, a common engliſh name for the gobius marinus, or ſea gudgeon.

ROCK *oil*. See PETROLEUM.

ROCK-*ſalt*. See the article SALT.

ROCKET, in pyrotechny, an artificial fire-work, conſiſting of a cylindrical caſe of paper, filled with a compoſition of certain combuſtible ingredients; which, being tied to a ſtick, mounts into the air, to a conſiderable height, and there burſts.

Rockets make a conſiderable part of all fire-works of entertainment; being not only uſed ſingly, but alſo as an ingredient in others.

The rocket, above defined, is properly the ſky rocket; the method of making which, is this. 1. A concave cylindrical mould, A B (plate CCXXXIV. fig. 2. n° 1.) is turned of hard wood, with a baſe B D, and a capital H C, uſually adorned

adorned with fuitable mouldings. This cylinder muft be open at both ends, and its dimenfions, for rockets of various fizes, as in the following article. When large, it is fometimes alfo made of brafs or tin; and when fmall, of bone. 2. Of the fame matter with the cylinder, is prepared a quadra, or foot ME; in the middle of which is turned a hemifphere GO, confiderably lefs than the cavity of the cylinder; making the cap or head of another cylinder IK, and reaching up within the cafe, where it is kept fteady by a pin LM.

Authors do not agree about the proportions.—Simionowitz prefcribes thofe that follow: if the diameter of the aperture HN be equal to that of a leaden ball of a pound, or at moft two pounds weight; the height of the cylinder, with the bafe and capital HC, to be feven diameters, and the heighth of the quadra FE $1\frac{1}{2}$. The altitude of the cylinder KI, 1. The diameter HN, $\frac{19}{23}$. The diameter of the hemifphere G, $\frac{4}{3}$. The heighth of the capital AC, 1. The fame author adds, that he finds by abundant experience, that, if the diameter of the aperture be divided into 100 parts, according to the different weight of the leaden balls, to whofe diameter it is equal, the following numbers, being multiplied by 7, give the heighth HE.

| Weight of leaden ball. | Subfeptuple of altitude HE. |
|---|---|
| 1 | 100 |
| 2 | 98 |
| 4 | 96 |
| 6 | 94 |
| 10 | 91 |
| 15 | 88 |
| 23 | 86 |
| 30 | 82 |
| 40 | 78 |
| 50 | 75 |
| 70 | 67 |
| 100 | 57 |

The mould being ready, a wooden cylinder or mould AB (*ibid.* n° 2.) is provided, whofe diameter is $\frac{2}{3}$ of the aperture of the frame, and its length equal to the heighth of the fame; to which is fixed a haft or hilt AD. About this mould is a thick ftrong paper, rolled, till fuch time as it fills the cavity of the frame. This done, where the haft is joined to the cylinder, as at A, it is choaked, *i. e.* firmly bound round with fine pack-thread, fo as to conftringe or ftraiten the cavity thereof. The part thus choaked or bound up FG (*ibid.* n° 3.) to be equal to the hemifphere GO n° 1.

The cafe is now taken off the mould, and put into the cavity of the frame (n° 1.) the choak GF upon the hemifphere; and in this difpofition is filled with a compofition defcribed in the following table, rammed ftrongly in by means of a wooden cylinder, or rammer fitting the cavity, and a mallet.

When filled, a paper-cap of a conical form is glued over the end of the cafe filled laft; and the fpace left a-top filled with whole gunpowder, to the heighth of about one diameter; then the rocket bound, or choaked in E, as before in G. Laftly, the rocket is bored, as is reprefented in AL (n° 3.) care being taken to do it in the middle. Some, indeed, bore the rocket, as they fill it, by thrufting a long, fharp fpike through the lower bafis, and drawing it out again, when the rocket is full; but it is beft not to bore till the rocket be ufed.

The boring is to go two thirds of the height of the rocket, abating one diameter of the cavity. The diameter of the bore in G is to be $\frac{1}{4}$ of the diameter of the cylinder; and in L $\frac{1}{8}$ of the lower diameter.

To make the rocket mount ftraight up, it is tied faft to the end of a long flender ftick, MD (*ibid.* n° 3.) eight times as long as the rocket, in fuch manner, as that, when poifed on the finger near the touch-hole F, the ftick (which is ufually made biggeft at this end, and floping gently to the other) may preponderate, though very little. The rocket, thus equipped, is hung at freedom, and lighted with port-fire.

Note, fome, inftead of a ftick to make the rocket mount, furnifh it with two wings, as MN (*ibid.* n° 5.) which have the fame effect; and, inftead of paper, fome make the cafes of wood covered with leather; others of a thin iron-plate. And fome, inftead of a wooden ftick, ufe an iron-wire, with a plummet at the end of it.

The compofition wherewith rockets are filled, confifts of the following ingredients, *viz.* falt-petre, charcoal, and fulphur, all well ground; but the proportions of

 thefe

these are various, for rockets of various sizes; as in the following table. Noting, that, in small rockets, gun-powder-dust is added.

Composition of ROCKETS of various sizes.

| Weight of Rocket. | Salt-pet. | Sulphur. | Char-coal. | Gun-powder dust. |
|---|---|---|---|---|
| ℔ | ℔ | ℔ | ℔ | |
| 100 or 60 | 30 | 10 | 20 | |
| 50 30 | 30 | 7 | 18 | |
| 20 18 | 42 | 12 | 26 | |
| 15 12 | 23 | 8 | 16 | |
| 10 9 | 62 | 9 | 20 | |
| 9 6 | 35 | 5 | 10 | |
| 5 4 | 64 | 8 | 16 | |
| 3 2 | 60 | 2 | 15 | |
| 1 | | 2 | 6 | 32 |
| Ounces. | Oun. | Oun. | Oun. | Ounces. |
| 9 | 4 | 1 | 2 | 9 |
| 6 | 12 | 1½ | 4 | 15 |
| 3 | 2 | ½ | 1½ | 12 |
| 1 | | | 2 | 15 |

Note, several rockets being disposed round the circumference of a wheel, whether circular or polygonous, the head of the one applied to the tail of another, and the wheel put in motion; as one rocket is spent, another will take fire; and the wheel be continued in its rotation.

As an additional ornament to rockets, it is usual to furnish them either with stars or with serpents, or sparks, which take fire when the rocket bursts: and sometimes little rockets are inclosed in great ones, to take fire when the large one is at its greatest height.

*To make stars for* ROCKETS. Mix three pounds of salt-petre with eleven ounces of sulphur, three ounces of beaten gun-powder, and ten of antimony. Moisten the mass with gum-water, and form them into little balls of the size of filberds; drying them well, either in the sun or an oven. When dry, inclose a number of them in the conical cap of the rocket.

*Theory of the flight of sky* ROCKETS. Mariotte takes the rise of rockets to be owing to the impulse or resistance of the air against the flame: Dr. Desaguliers accounts for it otherwise.

Conceive the rocket to have no vent at the choak, and to be set on fire in the conical bore; the consequence will be, either that the rocket would burst in the weakest place, or, if all its parts were equally strong, and able to sustain the impulse of the flame, the rocket would burn out immoveable. Now, as the force of the flame is equable, suppose its action downwards, or that upwards, sufficient to lift forty pounds. As these forces are equal, but their directions contrary, they will destroy each other's action.

Imagine, then, the rocket opened at the choak; by this means the action of the flame downwards is taken away, and there remains a force equal to forty pounds acting upwards, to carry up the rocket, and the stick it is tied to. Accordingly, we find that if the composition of the rocket be very weak, so as not to give an impulse greater than the weight of the rocket and stick, it does not rise at all; or if the composition be slow, so that a small part of it only kindles at first, the rocket will not rise.

The stick serves to keep it perpendicular; for if the rocket should begin to stumble, moving round a point in the choak, as being the common center of gravity of rocket and stick, there would be so much friction against the air, by the stick between the center and the point, and the point would beat against the air with so much velocity, that the reaction of the medium would restore it to its perpendicularity.

When the composition is burnt out, and the impulse upwards is ceased, the common center of gravity is brought lower towards the middle of the stick; by which means the velocity of the point of the stick is decreased, and that of the point of the rocket increased; so that the whole will tumble down, with the rocket-end foremost.

All the while the rocket burns, the common center of gravity is shifting and getting downwards, and still the faster and the lower, as the stick is the lighter; so that it sometimes begins to tumble before it be burnt out; but when the stick is a little too heavy, the weight of the rocket bearing a less proportion to that of the stick, the common center of gravity will not get so low, but that the rocket will rise straight, tho' not so fast.

*Method of making a water*-ROCKET. Make a rocket after the usual manner, excepting the number of choaks. Let its diameter be equal to that of a leaden-ball, of two or three inches diameter, and let it be bored to a third part of its heighth. Inclose the rocket in a hollow paper cy-

linder,

finder, which fmear over with melted pitch or wax, that it may refift the moifture.

Note, the weight of the rocket is to be fo proportioned to that of the water, that the whole cylinder may be immerged. Some, inftead of a cylinder, ufe a truncated cone, or even a fpheroid; and fome hang a weight to the end at which it is lighted.

ROCKINGHAM, a market-town of Northamptonfhire, fituated nineteen miles north of Northampton.

ROD, a wand, or long flender ftaff.

Rod is alfo ufed for a land meafure of fixteen feet and a half: the fame with perch and pole.

Rod, in gauging. See Gauging.

*Black*-Rod, a ftaff carried by the king's gentleman-ufher, as a badge of his office; this rod or ftaff is black, and has a lion in gold on its top. See Usher.

*Fifhing* Rod, a long taper rod or wand, to which the line is faftened for angling.

Of thefe there are feveral forts; as, 1. The troller, or trolling-rod, which has a ring at the end, for the line to go through, when it runs off a reel. 2. The whipper, or whipping-rod, which is weak in the middle, and top-heavy, but very flender. 3. The dopper, which is a ftrong rod, and very light. 4. The fnapper, or fnap-rod, which is a ftrong rod, peculiarly ufed for the pike. 5. The bottom-rod, which is the fame as the dapper, only fomewhat more pliable. 6. The fniggling or proking ftick, which is a forked ftick, that has a fhort ftrong line baited with a lob-worm: this is only ufed for eels in their holes. See the article Angling, &c.

RODEZ, a city of France, in the province of Guienne: eaft long. 2° 8′, north lat. 44° 20′.

RODRIGO. See Castle-rodrigo.

ROE, the fpawn or feed of fifh. That of the male fifhes is ufually diftinguifhed by the name of foft roe, or milt, and that of the female, by hard-roe, or fpawn.

So inconceivably numerous are thefe ovula, or fmall eggs, that M. Petit found 342144 of them in a carp of eighteen inches: but Mr. Leewenhoeck found in a carp no more than 211629. This laft gentleman obferves, that there are four times this number in a cod, and that a common one contains 9344000 eggs.

Roe is alfo one of the beafts of chafe, of the deer kind. See the article Cervus.

The roe-buck is called, the firft year, a hind; the fecond, a gyrle; the third, an henufe; the fourth, a roe-buck of the firft head; and the fifth, a fair roe-buck.

ROELLA, in botany, a genus of the pentandria monogynia clafs of plants, with a monopetalous infundibuliform-flower, divided into five parts at the limb; the fruit is a cylindraceous capfule, fhorter than the cup, compofed of a fingle valve, and containing numerous angulated feeds; whence it is evidently diftinct from the companula and polemonium.

ROER, the name of two rivers in Germany, one of which rifes on the confines of Heffe, and falls into the Rhine, a little below Duyfburg; the other rifes in the dutchy of Juliers, and falls into the Maefe at Roermond.

ROERMOND, a city of the United Netherlands, in the province of Gelderland: eaft longitude 5° 35′, north latitude 51° 18′.

ROGA, in antiquity, a prefent which the emperors made to the fenators, magiftrates, and even to the people; and the popes or patriarchs to their clergy.

Thefe rogæ were diftributed by the emperors on the firft day of the year, on their birth-day, or on the natalis dies of the cities: and by the popes and patriarchs, in paffion-week.

Roga is alfo ufed for the common pay of the foldiers.

ROGAROFF, a city of Poland, in the dutchy of Lithuania: eaft long. 30°, north lat. 52° 45′.

ROGATION, in the roman jurifprudence, a demand made by the confuls, or tribunes of the roman people, when a law was propofed to be paffed. Rogatio is alfo ufed for the decree itfelf made in confequence of the peoples giving their affent to this demand, to diftinguifh it from a fenatus confultum, or decree of the fenate.

Rogation-week, the week immediately preceding Whitfunday, fo called from the three fafts therein on Monday, Tuefday, and Wednefday, which are alfo called rogations, or rogation-days, from the extraordinary prayers and fupplications at this time offered to God by devout chriftians, to appeafe his anger and deprecate his judgments.

ROGUE, in law, an idle fturdy beggar; who by antient ftatutes is for the firft offence called a rogue of the firft degree, and punifhed by whipping, and boring through the griftle of the right ear with a hot iron; and for the fecond offence, is

is termed a rogue of the fecond degree, and if above eighteen years of age, ordered to be executed as a felon.

ROHAN, a town of France, in the province of Britany, fituated twenty miles north of Vannes.

ROLDUC, a town of the Netherlands, in the dutchy of Limburg, five miles north of Aix-la-Chapelle.

ROLL, in manufactories, fomething wound and folded up in a cylindrical form.

Few ftuffs are made up in rolls, except fattins, gawfes, and crapes, which are apt to break, and take plaits not eafy to be got out, if folded otherwife. Ribbons, laces, galloons, and paduas of all kinds, are alfo thus rolled.

A roll of tobacco is tobacco in the leaf, twifted on the mill, and wound twift over twift, about a ftick or roller. A great deal of tobacco is fold in America in rolls of various weights; and it is not till its arrival in England, Spain, France and Holland, that it is cut. See the article TOBACCO.

A roll of parchment, properly denotes the quantity of fixty fkins.

The antients made all their books up in the form of rolls, and in Cicero's time the libraries confifted wholly of fuch rolls. See the article *Form of* BOOKS.

ROLL, in law, fignifies a fchedule or parchment which may be rolled up by the hand into the form of a pipe.

In thefe fchedules of parchment all the pleadings, memorials, and acts of court, are entered and filed by the proper officer; which being done, they become records of the court. Of thefe there are in the exchequer feveral kinds, as the great wardrobe-roll, the cofferer's roll, the fubfidy-roll, *&c.*

Roll is alfo ufed for a lift of the names of perfons of the fame condition, or of thofe who have entered into the fame engagement. Thus a court-roll of a manor, is that in which the names, rents, and fervices of each tenant are copied and inrolled.

*Calves head* ROLL, a roll in the two temples, in which every bencher is taxed yearly at 2 s. every barrifter at 1 s. 6 d, and every gentleman under the bar at 1 s. to the cook, and other officers of the houfe; in confideration of a dinner of calves-heads, provided in Eafter-term.

*Mufter*-ROLL, that in which are entered the foldiers of every troop, company, regiment, *&c.*

As foon as a foldier's name is written down on the roll, it is death for him to defert.

ROLLS-OFFICE, is an office in Chancery-lane, London, appointed for the cuftody of the rolls and records in chancery. See the article MASTER *of the rolls.*

*Rider*-ROLL, a fchedule of parchment frequently fewed or added to fome part of a roll or record.

ROLLS *of parliament*, are the manufcript regifters, or rolls of the proceedings of our antient parliaments, which before the invention of printing were all engroffed on parchment, and proclaimed openly in every county. In thefe rolls are alfo contained a great many decifions of difficult points of law, which were frequently in former times referred to the decifion of that high court.

ROLL, in antiquity. See ACACIA.

ROLL, or ROLLER, is alfo a piece of wood, iron, brafs, *&c.* of a cylindrical form, ufed in the conftruction of feveral machines, and in feveral works and manufactures.

Thus in the glafs manufacture they have a running-roll, which is a thick cylinder of caft brafs, which ferves to conduct the melted glafs to the end of the table on which large looking-glaffes, *&c.* are caft. See the article GLASS.

Founders alfo ufe a roll to work the fand which they ufe in making their moulds.

The preffes called calenders, as ferving to calender ftuffs withal, confift, among other effential parts, of two rollers. It is alfo between two rollers that the waves are given to filks, mohairs, and other ftuffs proper to be tabbied.

Impreffions from copper-plates are alfo taken by paffing the plate and paper between two rollers. See the article *Rolling-prefs* PRINTING.

Rolls, in flatting-mills, *&c.* are two iron inftruments of a cylindrical form, which ferve to draw or ftretch out plates of gold, filver, and other metals.

Rolls, in fugar-works, are two large iron barrels, which ferve to bruife the canes, and to exprefs the juice. Thefe are caft hollow, and their cavities are filled up with wood, the cylinders of which are properly the rollers.

Rolls, among book-binders, are indeed of a different form; thefe being a kind of fmall brafs-wheels with flowers, leaves, *&c.* cut on the edge: thefe wheels are fixed on an axis to which there is a handle, and being rolled when hot round the edges, *&c.* of the cover of a book,

a book, leave the impreſſion of the flowers cut on the wheel, either plain or in gold.

Rollers, among gardeners, are large ſtone, iron, or wooden cylinders fixed in a large handle, and drawn over walks, graſs-plots, &c. to render them ſmooth and even.

Rolls, or rollers, among carpenters, maſons, &c. are plain cylinders three or four feet long, uſed for the moving of beams, huge ſtones, &c. Theſe are placed ſucceſſively under the fore-part of the body to be removed, which is at the ſame time puſhed forward by levers, &c. applied behind. For moving loads exceſſively heavy, the maſons, &c. have what they call endleſs rollers, which are about double the length and thickneſs of the common rollers, and beſides are girt with ſeveral large iron-hoops at each end: at a foot diſtance from the ends are four mortoiſes, or rather only two, but pierced through, into which are put the ends of long levers, which the workmen draw by long ropes faſtened to the ends, ſtill changing the mortoiſe as the roll has made a quarter of a turn. See LEVER.

ROLLER, in ſurgery, a long and broad bandage uſually of linen cloth, rolled round any part of the body, to keep it in, or diſpoſe it to a ſtate of health. See the article BANDAGE.

ROLLER, in ornithology, the grey ampelis, with the head variegated with black. See the article AMPELIS.

ROLLER is alſo the name of a ſpecies of the corvus, with a blood-red back, a green tail, and black wings. See the article CORVUS.

ROLLING PRESS *printing*. See the article PRINTING.

ROMAN, in general, ſomething belonging to the city of Rome. See ROME.

For the roman ſenate, emperors, conſuls, prætors, quæſtors, ædiles, games, &c. ſee SENATE, EMPEROR, &c.

The term roman purple, is at preſent uſed to denote the dignity of a cardinal. See the article CARDINAL.

The roman catholics are thoſe chriſtians who follow the doctrines and diſcipline of the church of Rome; the ſubſtance of which may be ſeen in pope Pius's creed, and has been treated of in the courſe of this work, under the articles TRANSUBSTANTIATION, MARRIAGE, CELIBACY, BAPTISM, SACRAMENT, MONK, MASS, HOST, IMAGE, RELICS, PURGATORY, &c. &c.

*King of the* ROMANS, in modern hiſtory, is a prince elected to be ſucceſſor to the reigning emperor of Germany. See the articles EMPEROR, ELECTOR, &c.

ROMAN ORDER, in architecture, the ſame with the compoſite order. See the articles ORDER and COMPOSITE.

As to the roman balance, indiction, year, language, citizens, &c. ſee the articles BALANCE, INDICTION, &c.

*Epiſtle to the* ROMANS, or *St. Paul's Epiſtle* to the ROMANS. See EPISTLE.

ROMANCE, in matters of literature, a fabulous relation of certain adventures deſigned for the entertainment and inſtruction of the readers. See FABLE.

The true nature and genuine characteriſtics of this ſpecies of writing are excellently explained by the ingenious author of the Rambler; who obſerves, that the works of fiction, with which the preſent generation ſeems more particularly delighted, are ſuch as exhibit life in its true ſtate, diverſified only by the accidents that daily happen in the world, and influenced by thoſe paſſions and qualities which are really to be found in converſing with mankind.

This kind of writing may be termed not improperly the comedy of romance, and is to be conducted nearly by the rules of comic poetry. Its province is to bring about natural events by eaſy means, and to keep up curioſity without the help of wonder: it is therefore precluded from the machines and expedients of the heroic romance, and can neither employ giants to ſnatch away a lady from the nuptial rites, nor knights to bring her back from captivity; it can neither bewilder its perſonages in deſarts, nor lodge them in imaginary caſtles.

Scaliger, upon Pontanus, remarks, that all his writings are filled with images, and that if you take from him his lilies and his roſes, his ſatyrs and his dryads, he will have nothing left that can be called poetry. In like manner, almoſt all the fictions of the laſt age will vaniſh, if you deprive them of a hermit and a wood, a battle and a ſhipwreck.

Why this wild ſtrain of imagination found reception ſo long, in polite and learned ages, it is not eaſy to conceive; but we cannot wonder, that, while readers could be procured, the authors were willing to continue it; for when a man had, by practice, gained ſome fluency of language, he had no farther care than to retire to his cloſet, to let looſe his invention, and heat his mind with incre-

dibi-

dibilities; and a book was produced without fear of criticifm, without the toil of ftudy, without knowledge of nature, or acquaintance with life.

The tafk of our prefent writers is very different; it requires, together with that learning which is to be gained from books, that experience which can never be attained by folitary diligence, but muft arife from general converfe, and accurate obfervation of the living world. Their performances have, as Horace expreffes it, *plus oneris quantum veniæ minus*, little indulgence, and therefore more difficulty. They are engaged in portraits of which every one knows the original, and can therefore detect any deviation from exactnefs of refemblance. Other writings are fafe, except from the malice of learning, but thefe are in danger from every common reader; as the flipper was cenfured by a fhoemaker, who happened to ftop in his way at the Venus of Apelles.

But the danger of not being approved as juft copiers of human manners is not the moft important apprehenfion that an author of this fort ought to have before him. Thefe books are written chiefly to the young, the ignorant, and the idle, to whom they ferve as lectures of conduct, and introductions into life. They are the entertainment of minds unfurnifhed with ideas, and therefore eafily fufceptible of impreffions; not fixed by principles, and therefore eafily following the current of fancy; not informed by experience, and confequently open to every falfe fuggeftion and partial account.

That the higheft degree of reverence fhould be paid to youth, and that nothing indecent or unfeemly fhould be fuffered to approach their eyes or ears, are precepts extorted by fenfe and virtue from an antient writer, by no means eminent for chaftity of thought. The fame kind, though not the fame degree of caution, is required in every thing which is laid before them, to fecure them from unjuft prejudices, perverfe opinions, and improper combinations of images.

In the romances formerly written, every tranfaction and fentiment was fo remote from all that paffes among men, that the reader was in very little danger of making any applications to himfelf; the virtues and crimes were equally beyond his fphere of activity; and he amufed himfelf with heroes, and with traitors, deliverers and profecutors, as with beings of another fpecies, whofe actions were regulated upon motives of their own, and who had neither faults nor excellencies in common with himfelf.

But when an adventurer is levelled with the reft of the world, and acts in fuch fcenes of the univerfal drama, as may be the lot of any other man, young fpectators fix their eyes upon him with clofer attention, and hope, by obferving his behaviour and fuccefs, to regulate their own practices, when they fhall be engaged in the like part.

For this reafon, thefe familiar hiftories may perhaps be made of greater ufe than the folemnities of profeffed morality, and convey the knowledge of vice and virtue with more accuracy, than axioms and definitions. But if the power of example is fo great, as to take poffeffion of the memory by a kind of violence, and produce effects almoft without the intervention of the will, care ought to be taken, that, when the choice is unreftrained, the beft examples only fhould be exhibited; and that which is likely to operate fo ftrongly fhould not be mifchievous or uncertain in its effects.

The chief advantages which thefe fictions have over real life, is, that their authors are at liberty, though not to invent, yet to felect objects, and to cull from the mafs of mankind, thofe individuals upon which the attention ought moft to be employed; as a diamond, though it cannot be made, may be polifhed by art, and and placed in fuch a fituation, as to difplay that luftre which before was buried among common ftones.

ROMANIA, a province of the pope's territories in Italy, including the Bolognefe and Ferrarefe. See the articles BOLOGNA and FERRARA.

ROMANIA is alfo the modern name of antient Thrace, which now makes a province of Turky in Europe; lying weftward of the Propontis, between the Euxine fea and the Archipelago.

ROMANS, or ROMANT, an appellation formerly given to the polite french language, in oppofition to the waloon.

ROMANS is alfo a town of Dauphine, in France, fituated on the river Ifere, fifteen miles fouth-weft of Grenoble.

ROME, *Roma*, the capital of the pope's territories and of Italy, and antiently the miftrefs of the roman Empire: eaft long. 13°, north lat. 41° 45′.

Rome is ftill a large and fine city, though not to be compared to antient Rome; the

the ſtreets are ſpacious and magnificently built; it has five bridges over the Tiber, twenty gates, three hundred churches, and a vaſt number of palaces, convents, triumphal arches, pillars, obeliſks, ſtatues, theatres, &c.

ROMNEY, a borough town of Kent, and one of the cinque ports, ſituated twelve miles ſouth-weſt of Dover.

It ſends two members to parliament.

ROMPEE, or Rompu, in heraldry, is applied to ordinaries that are repreſented as broken, and to chevrons, bends, or the like, whoſe upper points are cut off. See plate CCXXXIII. fig. 3.

RONCIGLIONE, a town of Italy, in the pope's territories, and in St. Peter's patrimony, 25 miles north of Rome.

RONDA, a town of Spain, in the province of Granada, twenty-two miles north of Gibraltar.

RONDEL, in fortification, a round tower, ſometimes erected at the foot of a baſtion.

RONDELETIA, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle petal of the infundibuliform-kind; the tube is cylindric and longer than the cup, and ventricoſe at the top; the limb is divided into five roundiſh ſegments, which bend backward: the fruit is a roundiſh coronated capſule, containing two cells; the ſeeds are numerous and ſmall.

ROOD, a quantity of land equal to forty ſquare perches, or the fourth part of an acre.

ROOF, in architecture, the uppermoſt part of a building.

The roof contains the timber-work, and its covering of ſlate, tile, lead, &c. tho' carpenters uſually reſtrain the word to the timber-work only.

The form of roofs is various: ſometimes it is pointed, in which caſe the moſt beautiful proportion is to have its profile an equilateral triangle: ſometimes it is ſquare, that is, the pitch or angle of the ridge is a right angle, which therefore is a mean proportion, between the pointed and flat roof, which laſt is in the ſame proportion as a triangular pediment: this is chiefly uſed in Italy, and the hot countries where there is but little ſnow. Sometimes roofs are made in the pinnacle-form: ſometimes they have a double ridge, and ſometimes they are mutilated, that is, conſiſt of a true and a falſe roof, which is laid over the former: ſometimes again they are in the form of a platform, as moſt of the eaſtern buildings are; and ſometimes they are truncated, that is, inſtead of terminating in a ridge, the roof is cut ſquare off at a certain height, covered with a terraſs, and incompaſſed with a balluſtrade; and ſometimes, again, a roof is made in the manner of a dome.

When the walls have been raiſed to their deſigned height, the vaults made, the joiſts laid, the ſtairs. &c. brought up, then the roof is to be raiſed, which embracing every part of the building, and with its weight equally preſſing upon the walls, is a band to all the work; and beſides, defends the inhabitants from rain or ſnow, the burning heat of the ſun, and the moiſture of the night, and is of no ſmall advantage to the building, in caſting off the rain water from the walls. See the article Gutters.

Roof-trees, or Ruff-trees, in a ſhip, are ſmall timbers which go from the half-deck to the fore-caſtle, and ſerve to bear up the gratings.

This term is alſo uſed for the upper timbers in any building.

*Hip*-Roof. See the article Hip-roof.

ROOK, in ornithology, a ſpecies of the wholly black corvus. See Corvus.

ROOM, a chamber, parlour, or other apartment in a houſe. See Building.

Rooms are either made with a vaulted or flat ceiling. If with a flat ceiling, Palladio ſays, that the height from the floor to the ceiling muſt be equal to their breadth; and the rooms above muſt be a ſixth part leſs in height than thoſe below: but if they are vaulted, the height of the vaults in rooms that are ſquare, is a third part more than its breadth.

With regard to the compartment and diſpoſition of rooms, he ſays, that the halls and magnificent rooms ought to be light and eaſy of aſcent; and that the ſmall rooms may be divided off to make cloſets. That the rooms for ſummer ought to be ſpacious and turned to the north; and thoſe for the winter to the ſouth and weſt, and rather ſmall than otherwiſe: becauſe we ſeek the ſhade in ſummer, and in winter the ſun; beſides ſmall rooms are more eaſily warmed than large. But the large rooms with the middling, and thoſe with the ſmall, ought to be ſo diſtributed that one part of the fabric may correſpond with the other, and that the body of the edifice may have in itſelf a certain convenience in its members, which may render the whole beauful and graceful.

Rooms, in a ſhip, are places divided by partitions

partitions or bulk-heads. See the articles GUN-ROOM, COOK-ROOM, *&c.*

ROOMER, in the fea-language; a fhip is faid to be a roomer when fhe is larger than ordinary.

ROOT, *radix*, among botanifts, denotes that part of a plant which imbibes the nutritious juices of the earth, and tranfmits them to the other parts. See the articles PLANT and VEGETATION.

The roots of plants are diftinguifhed, according to their different forms, into bulbofe, fibrofe, granulofe, grumofe, tuberofe, and tap-roots. See BULBOSE, *&c.*

As to the gathering and preferving roots for medicinal ufes, the Edinburgh-difpenfatory directs, that the annual roots be taken up before they fhoot out ftems or flowers; the biennial ones, for the moft part, in the autumn of the firft year; and the perennial ones when the leaves begin to fall, and therefore generally in autumn: then being cleanfed by wafhing, and freed from the withered and decayed fibres, they are to be hung in a fhady place pervious to the air, till they are moderately dry: the thicker roots fhould be flit lengthwife; or they may be cut tranfverfely into thin pieces, and the pith taken out. Thefe roots, which are very numerous, have been treated of under their feveral articles RHUBARB, JALAP, HELLEBORE, *&c. &c.*

ROOT-GRAFTING, in gardening. See the article GRAFTING.

ROOT, in mathematics, a quantity confidered as the bafis or foundation of a higher power; or one which being multiplied into itfelf any number of times, produces a fquare, cubic, biquadratic, *&c.* quantity; called the fecond, third, fourth, *&c.* power of the root, or quantity, fo multiplied into itfelf: thus $a$ is the fquare root of $a \times a$, or $a^2$; and 4 the fquare root of $4 \times 4 = 16$. Again, $a$ is the cube root of $a \times a \times a = a^3$; and 3 the cube-root of $3 \times 3 \times 3 = 27$: and fo on. See the articles INVOLUTION, POWER, and EXTRACTION *of roots.*

The roots of powers are expreffed by placing the radical fign $\sqrt{}$ over them, with a number denoting what kind of root they are: thus the fquare or fecond root of 16 is expreffed by $\sqrt[2]{16}$, and the cube or third root of 27 by $\sqrt[3]{27}$; and, in general, the $n$th root of $a$ raifed to the power $m$, is expreffed by $\sqrt[n]{a^m}$. When the root of a compound quantity is wanted, the vinculum of the radical fign muft be drawn over the whole: thus the fquare root of $a^2 + 2ab + b^2$ is expreffed by $\sqrt[2]{a^2 + 2ab + b^2}$; and it ought to be obferved, that when the radical fign has no number above it, to denote what root is wanted, the fquare root is always meant; as $\sqrt{a^2}$, or $\sqrt{16}$, is the fquare root of $a^2$, or the fquare root of 16.

ROOTS, *radices*, in grammar, are the primitive words of a language, whence the others are formed or derived. See the articles WORD and LANGUAGE.

ROPE, hemp, hair, *&c.* fpun out into a thick yarn, and then feveral ftrings of this yarn twifted together by means of a wheel. When made very fmall it is called a cord, and when very thick, a cable. See CORD and CABLE.

Dr. Defaguliers, in the firft volume of his Experimental Philofophy, has computed the forces neceffary to bend ropes of different diameters, ftretched by different weights, round rollers of different bigneffes, to be as in the following table.

| Diameters of the ropes of three ftrands, expreffed in tenth parts of an inch. | Weights ftretching the ropes, expreffed in *lb.* avoirdupois. | Refiftance about a roller of half an inch diameter, in *oz.* avoirdupois. | Refiftance about a roller of one inch diameter in *oz.* avoirdupois. | Refiftance about a roller 1½ inches diameter in *oz.* avoirdupois. |
|---|---|---|---|---|
| 0.5 | 60*lb.* | 225*oz.* | 112½*oz.* | 75*oz.* |
| 0.2 | 60 | 90 | 45 | 30 |
| 0.1 | 60 | 45 | 22½ | 15 |
| 0.5 | 40 | 150 | 75 | 50 |
| 0.2 | 40 | 60 | 30 | 20 |
| 0.1 | 40 | 30 | 15 | 10 |
| 0.5 | 20 | 75 | 37½ | 25 |
| 0.2 | 20 | 30 | 15 | 10 |
| 0.1 | 20 | 15 | 7½ | * |

On the whole, it is found by experiments, that the difficulty of bending a rope round a roller decreafes directly as the diameter of the roller increafes; or is, inverfely, as the diameter of the roller.

Ropes are made for various ufes, as for binding, ftaying, drawing, fufpending, *&c.*

The greateft confumption of ropes is in navigation, for the tackling of fhips: where, though ropes include the whole cordage, there are feveral particularly fo denominated, and which have particular names given to them: thefe are, 1. Aun-



ing-

ing-ropes, which are for ſpreading the aunings. 2. Bell-ropes, which are made faſt to the crank for ſtriking it. 3. Boat-rope, that by which the boat at the ſtern is towed. 4. Bolt-ropes, the head and body ropes ſowed round the ſails. 5. Breaſt-rope, that made faſt to the ſhrouds in the chains, to ſupport the man that heaves the lead. 6. Bucket-rope, that which is tied to the bucket, for hauling up water. 7. Buoy-rope, that which is tied to the buoy by one end, and to the ſtock of the anchor by the other. 8. Can-hook-ropes, which are ſeized to each hook, to hoiſt hogſheads, &c. on board. 9. Cat-rope, that uſed for hoiſting up the anchor in order to be ſtowed at the bow. 10. Davit-rope, is reeved through a hole made at each end, for hauling the davit to either ſide of the fore-caſtle. 11. Entring-rope, to take hold of, in going up the ſhip's ſide. 12. Luff-hook-rope, is for bouſing the tack-aboard, when it blows hard, and is a ſort of preventer to the tack. 13. Grapnel-rope, that which being bent to a grapnel, either the long-boat, pinnace, or yawl rides by it. 14. Gueſs-rope, is for keeping the long-boat, pinnace, or yawl from ſteeving, or going too much in and out when towing. 15. Parrel-rope is reeved through the ribs and trucks, and, with the breaſt-ropes, laſhes the parrel to the maſts. 16. Rudder-rope, that reeved through a hole in the boat's rudder. 17. Slip-rope is for triſeing up the bites of the cable to the rails of the head. 18. Stantion-ropes, thoſe reeved through the eyes of the ſtantions. 19. Swabb-rope ſerves as a handle to the eyes of the ſtantions. 20. Top-ropes are thoſe with which the top-maſts are ſet or ſtruck; they are reeved through an iron-bound block, which hooks under the cap, and then reeved through the heel of the top-maſt; the other part of them comes down to the top-tackle-falls, which has double blocks iron-bound, and hooks to ring bolts upon the deck. 21. Tiller-ropes, are to keep the tiller ſteady, that it may not fly from ſide to ſide. 22. Waiſt-ropes, for boats to make faſt to, along ſide. 23. Wheel-rope, that which goes round the ſpindle of the ſteering-wheel, and from thence to the titter.

ROPE-YARN, among ſailors, is the yarn of any rope untwiſted, but commonly made up of junk; its uſe is to make ſinnet, mats, &c.

ROS, DEW. See the article DEW.

ROSA, the ROSE, in botany. See ROSE.

ROSACEOUS, among botaniſts, an appellation given to ſuch flowers, as are compoſed of ſeveral petals or leaves, diſpoſed in a ſort of circular form, like thoſe of the roſe: ſuch are the flowers of the piony, crowfoot, cinquefoil, &c. In this ſort of flowers the diſpoſition only of the leaves is regarded, their number being of no conſequence. It is very ſeldom that the number is two or four, except in the circæa and onagra. The moſt frequent number of leaves in theſe flowers is five, and ſuch as have four differ from the cruciform flowers, not only in their diſpoſition, but in this, that the number is in the ſame ſpecies indeterminately, four, five, or ſix, as is the caſe in the clematitis, the capers, and the ſpecies of rue, whereas in the cruciform ones it is ever conſtant. See the article BOTANY.

ROSARY, among the roman-catholics, the ſame with chaplet. See CHAPLET. Before a perſon repeats his roſary, he muſt croſs himſelf with it; he muſt then repeat the apoſtles' creed, and ſay a pater-noſter, and three aves, on account of the three relations which the virgin bears to the three perſons in the trinity; after which he paſſes on to his decads.

Roſary alſo denotes a particular form of devotion addreſſed to the virgin, to which the chaplet of that name is accommodated.

ROSCOMMON, a county of Ireland, bounded by Letrim on the north, and Galway on the ſouth.

ROSE, *roſa*, in botany, a genus of the icoſandria-polygynia claſs of plants, the flower of which is compoſed of five petals, obverſely cordated, and arranged in a circular form: the fruit is formed of the fleſhy baſe of the cup, which is of a turbinated figure, coloured, ſoft, containing only one cell drawn together at the neck, and coronated with ſome irregular laciniæ; the ſeeds are numerous, oblong and hairy. See plate CCXXXIV. fig. 3.

The wild briar, with beautiful pinnated leaves, a white or pale red flower, and the common hip for its fruit, is that above deſcribed: and, indeed, all the beautiful roſes in our gardens, are only varieties of this ſpecies, principally owing to culture; the red, the damaſk, the white, the variegated, &c. roſes, being all produced from this original ſpecies.

The flowers of the red roſe are aſtrin-

 gent,

gent, thofe of the damafk-rofe purgative, and the fruit of the wild rofe pectoral. The rofe-water of the fhops, diftilled from the flowers of the damafk-rofe, has been celebrated for many virtues; but its fragrant fmell is the only quality now regarded in it. There is alfo a fyrup, made either from the juice, or infufion of the frefh flowers of damafk-rofes.

ROSE, in architecture, an ornament cut in the form of a rofe, chiefly ufed in corniches, frizes, vaults of churches, *&c.* and particularly in the middle of each face in the corinthian abacus.

ROSE-NOBLE, an antient englifh gold-coin, firft ftruck in the reign of Edward III. It was formerly current at 6 s. 8 d. and fo called becaufe ftamped with a rofe.

ROSE-WOOD, *rhodium*, or *afpalathus*, in the materia medica. See ASPALATHUS.

ROSEBRUGGE, a town of Flanders, eleven miles north-weft of Ypres.

ROSEMARY, *rofmarinus*, in botany, a genus of the diandria-monogynia clafs of plants, with a ringent monopetalous flower, whereof the upper lip is bifid and erect, and the under lip trifid and reflex; there is no pericarpium, the cup holding the four feeds in its bottom.

Rofemary has at all times been a favourrite fhrub in medicine: it is full of volatile parts, as appears by its tafte, fmell, and analyfis. It is a very valuable cephalic, and is good in all diforders of the nerves, and in hyfteric and hypochondriac cafes. It is good in palfies, apoplexies, epilepfies, and vertigoes. It ftrengthens the fight, and fweetens the breath. It is greatly commended by fome againft obftructions of the vifcera, particularly of the liver and fpleen; and in the jaundice. The flowers have the credit of being great cordials; and fome imagine they even poffefs the virtues of the whole plant in a more exalted degree than any other part. However, the flowery tops, leaves, and hufks, together with the leaves themfelves, are much fitter for all purpofes, than the flowers alone.

ROSICRUCIANS, or ROSYCRUCIANS. See the article ROSYCRUCIANS.

ROSIENNE, a town of Samogitia, in Poland: eaft longitude 23° 30′, north latitude 55° 50′.

ROSIN, or RESIN. See the article RESIN.

ROSMARINUS, ROSEMARY, in botany. See the article ROSEMARY.

ROSS, county of Scotland, bounded by Sutherland on the north, by the German fea and the Murray frith on the eaft and fouth, and by Invernefs-fhire and the weftern ocean on the fouth and weft.

ROSS is alfo a market-town, fituated on the river Wye, eleven miles fouth of Hereford.

ROSSANO, a city and port-town of Calabria, in the kingdom of Naples, eighty miles fouth-weft of Taranto.

ROSSE, a port-town of Ireland, twenty-two miles weft of Kinfale.

ROS-SOLIS, SUN-DEW, an agreeable fpirituous liquor, compofed of burnt brandy, fugar, cinnamon, and milk-water; and fometimes perfumed with a little mufk: it is fo called, as being at firft prepared wholly of the juice of the plant rofs-folis, or drofera. See the article DROSERA.

ROSTING, or ROASTING. See the article ROASTING.

ROSTOCK, an imperial city of lower Saxony, fituated on a bay of the Baltic fea: eaft longitude 12° 15′, and north latitude 54° 20′.

ROSTOF, or ROSTOVA, the capital of a territory of the fame name, in Ruffia: eaft longitude 40°, and north latitude 57° 20′.

ROSTRA, in antiquity, a part of the roman forum, wherein orations, pleadings, funeral harangues, *&c.* were delivered.

ROSTRI-FORMIS PROCESSUS, in anatomy. See the article CORACOIDES.

ROSTRUM literally denotes the beak or bill of a bird; and hence it has been figuratively applied to the beak, or head of a fhip.

ROSTRUM, in chemiftry, implies the nofe or beak of the common alembic, which conveys the liquor diftilled into its receiver. See the article ALEMBIC.

ROSYCRUCIANS, ROSICRUCIANS, or *brothers of the rofy crofs*, a name affumed by a fect or cabal of hermetical philofophers, who appeared, or at leaft were firft taken notice of, in Germany, in the beginning of the XVIth century. They pretended to be mafters of all fciences, and to have many important fecrets, particularly that of the philofophers's ftone. See the article PHILOSOPHER.

Their fociety is frequently denoted by the abbreviatures F. R. C.

ROT, a difeafe incident to fheep, arifing from wet feafons, and too moift pafture. It is a very hard thing to prevent the rot, if the year prove very wet, efpecially in May and June. Salt marfhes, and lands where broom grows, are the beft places of prefervation for them. Sheep are fometimes all cleared of the rot, when not

too

too far gone with it, only by removing them into broom-fields. Scurvy-grafs, muftard, parfley, and thyme are alfo good for the prevention of it.

Some propofe the giving fheep half a handful of bay-falt, every month or oftener; and there is great probability that this may be of fervice: but the rational way of attacking all diforders in cattle, is by confidering what are the caufes of them. It will appear, upon enquiry, that wet feafons are the general occafions of the rot in fheep, and therefore it would be advifeable for the owners, when fuch feafons come on, to remove thofe animals into the drieft paftures they can, and then to feed them principally with dry fweet hay, oats, bran, and the like; this would prevent the occafion: and if they were already a little infected, fome falt given with their dry food, would be a happy means of curing them.

ROTA, WHEEL, in mechanics. See the article WHEEL.

There is a celebrated problem in mechanics, called rota ariftotelica, Ariftotle's wheel, becaufe that philofopher is the firft who took notice of it. The matter to be accounted for, is how a point in the nave of a wheel comes to defcribe, during one revolution, a line equal to the length of the outer circumference of the wheel, when a point in the outer circumference does no more.

Many great men having attempted in vain to account for this phænomenon, Mr. de Meyran, a french gentleman, had the good fortune to light on a folution of it, which the Academy of Sciences declared to be fatisfactory. It is this: a wheel is only acted on, or drawn forward, in a right line: its circular motion, or rotation, arifing purely from the refiftance of the ground whereon it is applied. Now this refiftance is equal to the force wherewith the wheel is drawn in the right line, inafmuch as it defeats that direction; and, confequently, the caufes of the two motions being equal, their effects are equal too; or, a point in the wheel defcribes, during one revolution, a right line on the ground equal to its outer circumference.

But as to the nave of the wheel, the cafe is otherwife; for though it is drawn in a right line by the fame force as the outer circumference, yet it only turns round becaufe the wheel turns, and can only turn with it, and in the fame time. Hence it follows, that its circular velocity is lefs than that of the circumference of the wheel, in the ratio of the two circumferences; and therefore, of courfe, its circular motion is lefs than its rectilinear one. Since then it neceffarily defcribes a right line equal to that defcribed by the circumference of the wheel, it can only do it by fliding along.

ROTA is alfo the name of an ecclefiaftical court at Rome, compofed of twelve prelates, whereof one muft be a German, another a Frenchman, and two Spaniards; the other eight are Italians, three of whom muft be Romans, and the other five a Bolognefe, a Ferraran, a Milanefe, a Venetian, and a Tufcan.

This is one of the moft auguft tribunals in Rome, which takes cognizance of all fuits in the territory of the church, by appeal; as alfo of all matters beneficiary and patrimonial.

ROTATION, in geometry, a term chiefly applied to the circumvolution of any furface round a fixed and immoveable line, which is called the axis of its rotation: and by fuch rotations it is, that folids are conceived to be generated. See the article GENESIS.

The late ingenious Mr. de Moivre fhews how folids, thus generated, may be meafured or cubed. His method is this: for the fluxion of fuch folids, take the product of the fluxion of the abfcifs, multiplied by the circular bafe; and fuppofe the ratio of a fquare to the circle infcribed in it to be $\frac{n}{1}$: then the equation expreffing the nature of any circle, whofe diameter is $d$, is $yy = dx - xx$. Therefore $\frac{4dx\dot{x} - x^2\dot{x}}{n}$ is the fluxion of a portion of the fphere; and, confequently, the portion itfelf $4\frac{1}{2}dxx - x\frac{1}{3}x^3$, and the circumfcribed cylinder is $\frac{4dxx - x^3}{n}$; and therefore the portion of the fphere is to the portion of the circumfcribed cylinder, as $\frac{1}{2}d - \frac{1}{3}x$ to $d - x$.

ROTATION, or REVOLUTION, in aftronomy. See the article REVOLUTION.

ROTATORES, in anatomy, the name by which fome call the oblique mufcles of the eye. See EYE and OBLIQUUS.

ROTATORES is alfo applied to the trochanters of the thigh-bone. See the article FEMUR and TROCHANTER.

ROTENBURG, a town of Franconia, in Germany: eaft long. 10° 5′, north lat. 49° 20′.

ROTENBURG is alfo a town of Lower Saxony, in the dutchy of Verden, twenty-four miles eaft of Bremen.

ROTHER, or RUDDER. See RUDDER.

ROTHERAM, a market-town of Yorkfhire, 35 miles fouth-weft of York.

ROTHSAY, a parliament-town of Scotland, in the ifle of Bute: weft longitude 5°, and north latitude 55° 50′.

ROTING, a town of Franconia, in Germany: eaft long. 9° 50′, and north lat. 49° 30′.

ROTONDO, or ROTUNDO, in architecture, an appellation given to any building that is round both within and without fide, whether it be a church, a falon, or the like. The moft celebrated rotondo of the antients, is the pantheon at Rome. See the article PANTHEON.

ROTTENNESS, or PUTREFACTION. See the article PUTREFACTION.

ROTTERDAM, a city of the province of Holland, fituated on the north bank of the Maefe, thirty miles fouth of Amfterdam, and thirteen miles fouth-eaft of the Hague: eaft longitude 4° 20′, and north latitude 52°.

ROTULA, in anatomy, the fame with the patella. See the article PATELLA.

ROTULORUM CUSTOS. See the article CUSTOS ROTULORUM.

ROTULUS, a ROLL. See ROLL.

ROTUNDO, or ROTONDO. See the article ROTONDO.

ROTUNDUS, in anatomy, a name given to feveral mufcles, otherwife called teres. See the articles TERES and MUSCLE.

*Pronator* ROTUNDUS. See PRONATORS.

ROTWEIL, a town of Swabia, in Germany, fituated on the river Neckar: eaft long. 8° 30′, and north lat. 48° 8′.

ROUEN, a city of France, and capital of Normandy, fituated on the north fide of the Seyne, fixty-five miles north of Paris, and forty five miles fouth-eaft of Havre de Grace and the Britifh Channel: eaft long. 1° 6′, north lat. 49° 30′.

ROVEREDO, a city of the bifhopric of Trent, eight miles fouth of Trent.

ROVERGNE, a divifion of Guienne, in France.

ROUGE-CROSS. See POURSUIVANT.

ROUGHNESS, in mechanics. See the articles FRICTION and RESISTANCE.

ROVIGO, the capital of the Polefin de Rovigo, in Italy, fubject to Venice: eaft long. 12° 25′, north lat. 45° 6′.

ROUND, *rotundus*, in geometry. See the articles CIRCLE, GLOBE, and SPHERE.

The italian muficians give the name of *b* round, to what we call a flat *b*. See the article FLATS.

ROUND, in a military fenfe, fignifies a walk which fome officer, attended with a party of foldiers, takes in a fortified place around the ramparts, in the night-time, in order to fee that the centries are watchful, and every thing in good order.

The centries are to challenge the rounds at a diftance, and reft their arms as they pafs, to let none come near them; and when the round comes near the guard, the centry calls aloud, *who comes there?* and being anfwered, *the rounds*; he fays *ftand*; and then calls the corporal of the guard, who draws his fword, and calls alfo, *who comes there*; and when he is anfwered, *the rounds*, he who has the word advances, and the corporal receives it with his fword pointed to the giver's breaft. In ftrict garrifon the rounds go every quarter of an hour.

*Way of the* ROUNDS. See WAY.

*Counter*-ROUNDS. See COUNTER.

ROUND-HOUSE, a kind of prifon, for the nightly watch in London to fecure diforderly perfons, till they can be carried before a magiftrate.

ROUND HOUSE, in a fhip, the uppermoft room, or cabbin, on the ftern of a fhip, where the mafter lies.

*To* ROUND *a horfe*, in horfemanfhip, a general term for all forts of maneges upon a volt, or circular tread. See the article VOLT.

ROUNDELAY, a kind of antient poem, thus termed, according to Menage, from its form, becaufe it turns back again to the firft verfe, and thus goes round. This poem is little known among us, but is very common among the French, who call it rondeau. It confifts commonly of thirteen verfes, eight whereof are in one rhime, and five in another. It is divided into couplets, at the end of the fecond and third whereof the beginning of the roundelay is repeated, and that if poffible in an equivocal or paufing fenfe.

ROUNDELET. See RUNDLET.

ROUNDO, ROUNDELAY, in mufic, a kind of burden or ritornello, where the beginning of each couplet is repeated at the end thereof.

ROUSE, among falconers, is when a hawk lifts up and fhakes herfelf.

ROUSE *a hawfer*, or *cable*, in the fea-language, fignifies to haul in part of the hawfer or cable, which lies flack in the water.

ROUSELAER, a town of the Netherlands, in

in the province of Flanders, fituated eleven miles north-eaft of Ypres.

ROUSILLON, formerly a province of Spain, now united to France, is bounded by Languedoc on the north, by the Mediterranean fea on the eaft, by Catalonia on the fouth, and by the Pyrenean mountains on the weft, being about fifty-five miles long, and thirty-fix broad.

ROUSSIN, in the manege, is a ftrong, well knit, and ftowed horfe, fuch as are brought into France from Germany and Holland.

ROUT, a public road, highway, or courfe, efpecially that which military forces take. This word is alfo ufed for the defeat and flight of an army.

ROUT, in law, is applied to an affembly of perfons, going forcibly to commit fome unlawful act, whether they execute it or not.

The difference between a rout and a riot feems to be this, that a rout is where perfons are unlawfully affembled, and have moved forwards, in order to commit the unlawful act intended, but part without doing it: whereas riot is taken for the diforderly fact committed by any fuch unlawful affembly. Two things, however are common both to riot and rout, as alfo unlawful affembly; the one is, that three perfons at leaft be gathered together: the other is, that, being gathered together, they difturb the peace either by words, fhew of arms, turbulent gefture, or actual violence. See RIOT.

ROWEL, among farriers, a kind of iffue, made by drawing a fkain of filk, thread, hair, or the like, through the nape of the neck, or the other part, of a horfe; anfwering to what, in furgery, is called a feton. See the article SETON.

The rowelling of horfes is a method of cure frequently had recourfe to, in cafes of inward ftrains, efpecially about the fhoulders or hips, as alfo for hard fwellings not eafy to be diffolved. The operation is this: a little flit being made through the fkin, about an handbreadth below the part aggrieved, big enough to put a fwan's quill in; the fkin is raifed from the flefh, the end of the quill put in, and the fkin blowed from the flefh upwards, and all over the fhoulder; then the hole being ftopped with the finger, the part blown is beat with an hazel-ftick, and the wind fpread with the hand all over, and then let go; this done, a fkain of horfe-hair, or red farfenet, half the thicknefs of the little finger, is put in a rowelling needle, feven or eight inches long, and the needle is put into the hole, and drawn through again, fix or feven inches higher; then the needle is drawn out, and the two ends of the rowel tied together, anointing it every day, as well as before the putting it in, with fweet butter and hog's greafe, and drawing it backwards and forwards in the fkin, to make the putrid matter difcharge itfelf more plentifully.

Others, difliking thefe rowels, as making too large a fore and fcar, ufe the french rowel, which is a round piece of ftiff leather, with a hole in the midft, laying it flat between the flefh and fkin, the hole in the rowel juft againft that in the fkin, fewing it with a needle and thread drawn through the hole and the fkin, cleaning it once in two or three days, and then anointing it afrefh.

ROWELS *of a fpur*. See SPUR.

ROWS *of trees*. See PARALLELISM.

ROXBURGH, the name of a county in Scotland, which fends one member to parliament.

ROXENT CAPE, or ROCK *of Lifbon*, a mountain and remarkable promontory in Portugal, fituated in the Atlantic ocean, at the north entrance of the river Tagus, twenty-two miles north of Lifbon.

ROYAL, or REGAL, fomething belonging to a king: thus we fay, royal family, royal affent, royal exchange, &c. See the articles FAMILY, ASSENT, &c.

ROYAL EXCHANGE, the burfe or meeting-place of the merchants in London. See the article EXCHANGE.

It was built in 1566, at the charge of Sir Thomas Grefham, and in a folemn manner, by herald with found of trumpet, in prefence of queen Elizabeth, proclaimed the royal exchange. Till that time the merchants met in Lombard-ftreet. It was built of brick, yet then efteemed the moft fplendid burfe in Europe. An hundred years after its building, at the great fire, it was burnt down; but foon raifed again in a ftill more magnificent manner, the expence thereof amounting to £. 50,000. One half of this fum was difburfed by the chamber of London, the other by the company of mercers, who, to reimburfe themfelves, let to hire 190 fhops above ftairs, at £ 20 each, which, with other fhops, &c. on the ground, yield a yearly rent of above £.4000; yet the ground it ftands on does not exceed three-fourths of an acre, whence it is obferved to be much the

richeft

richeſt ſpot of ground in the world. It is built quadrangular, with walks around, wherein the merchants of the reſpective countries aſſociate themſelves. In the middle of the area or court is a fine marble-ſtatue of king Charles II. in the habit of a roman Cæſar, erected by the ſociety of merchant-adventurers. Around are the ſtatues of the ſeveral kings ſince the Norman conqueſt, ranged.

ROYAL-*oak*, a fair ſpreading tree at Boſcobel, in the pariſh of Donnington in Staffordſhire, the boughs whereof were once covered with ivy; in the thick of which king Charles II. ſat in the daytime with colonel Careleſs, and in the night lodged in Boſcobel-houſe; ſo that they are miſtaken who ſpeak of it as an old hollow oak, it being then a gay flouriſhing tree, ſurrounded with many more. The poor remains thereof are now fenced in with a handſome wall, with this inſcription over the gate in gold-letters: *Fœliciſſimam arborem quam in aſylum potentiſſimi regis* Caroli II. *Deus op. max. per quem reges regnant, hic creſcere voluit*, &c.

ROYAL-*ſociety*. See SOCIETY.

ROYALTIES, the rights of the king, otherwiſe called the king's prerogative, and the regalia. See the articles PREROGATIVE and REGALIA.

ROYAN, a caſtle of France, in the province of Saintonge, ſituated at the mouth of the river Garonne, thirty miles ſouth of Rochelle.

ROYENA, AFICAN BLADDER-NUT, in botany, a genus of the decandria-digynia claſs of plants, the corolla whereof is formed of a ſingle petal; the tube is of the length of the calyx; the limb is patent, reflex, and divided into five oval ſegments; the fruit is a roundiſh capſule, formed of four valves, marked with four furrows, but containing only one cell; the ſeeds are four oblong triangular nuts, included in a calyptra.

ROYSTON, a market-town, ſituated in the counties of Hertford and Cambridge, thirty-eight miles north of London.

RUATAN, an iſland in the gulph of Honduras, in North America: weſt long. 89°, and north lat. 16°.

RUBARB. See the article RHUBARB.

RUBBING. See the articles ATTRITION and FRICTION.

RUBELLIO, in ichthyology, the name whereby ſome authors call the roach. See the article CYPRINUS.

RUBETA, the TOAD, in zoology. See the article TOAD.

RUBIA, MADDER, in botany, a genus of the tetrandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle, plane acute petal, hollowed at the baſe, and divided into four ſegments; the fruit conſiſts of two ſucculent, ſmooth, round berries, growing together; the ſeed is ſingle, roundiſh, and umbilicated. See plate CCXXXV. fig. 2.

For the ſeveral uſes of this plant in dying, &c. ſee the article MADDER.

RUBICAN, in the manege. A horſe is ſoid to be of a rubican colour, when of a bay, ſorrel, or black, with a light grey or white upon the flanks, but ſo that this grey or white is not predominant there.

RUBIFYING, in chemiſtry, the act of turning a thing red by the force of fire, &c.

RUBIGALIA, in antiquity, a feaſt celebrated by the Romans, in honour of the god Rubigus, or the goddeſs Rubigo, to engage thoſe deities to preſerve the corn from blights and mildews.

The rubigalia were inſtituted by Numa, in the eleventh year of his reign and were celebrated on the ſeventh of the calends of May.

RUBIGO, a diſeaſe incident to corn, commonly called Mildew, being a ſpecies of blight. See the article BLIGHT.

RUBININSKA, one of the northern provinces of Ruſſia, bounded by the province of Dwina on the north, by Syrianes on the eaſt, by Belozero on the ſouth, and by the lake of Onega on the weſt.

RUBRIC, *rubrica*, in the cannon-law, ſignifies a title or article in certain antient law-books; thus called becauſe written, as the titles of the chapters in our antient Bibles are, in red letters.

Rubrics alſo denote the rules and directions given at the beginning, and in the courſe of, the liturgy, for the order and manner in which the ſeveral parts of the office are to be performed. There are general rubrics and ſpecial rubrics, a rubric for the communion, &c. In the romiſh Miſſal and breviary are rubrics for matins, for lauds, for tranſlations, beatifications, commemorations, &c.

RUBRICA, in natural hiſtory, a name given to ſeveral kinds of marles and ochres, the two principal of which are the rubrica fabrilis of authors, being a ſoft heavy red marle, commonly called reddle, and uſed by painters, &c. See the articles MARLE

MARLE and REDDLE. The other, called the rubrica finopica of the antients, is a fine heavy purple ochre, much ufed both in painting and medicine. See the article OCHRE.

RUBUS, the BRAMBLE and RASPBERRY-BUSH, in botany, a genus of the icofandria-pentagynia clafs of plants, the corolla whereof confifts of five roundifh erecto-patent petals, of the length of the cup, and inferted into it; the fruit is a compound berry; the acini it is compofed of are roundifh, and arranged into a clufter, convex at top and concave below, each acinus has only one cell; the feeds are fingle and oblong; the receptacle of the pericarpia is conic; the acini in moft of the fpecies grow together fo as to be infeparable without breaking. See plate CCXXXV. fig. 4.

The ufe of this plant in medicine is as a refrigerant and aftringent, and therefore the fruit leaves, &c. are recommended in dyfenteries, vomitings, hæmorrhages of the womb, nofe, &c.

RUBY, *rubinus*, in natural hiftory, a fpecies of the chroftafima clafs of gems, being a beautiful gem of a red colour with an admixture of purple. See the article GEM.

This in its moft perfect and beft coloured ftate, is a gem of prodigious beauty and extreme value; it is often found perfectly pure and free from blemifhes or foulnefs, but much more frequently debafed greatly in its value by them, efpecially in the larger fpecimens. It is of very great hardnefs, equal to that of the fapphire, and fecond only to the diamond. It is various in fize, but lefs fubject to variations in its fhape than moft of the other gems. It is ufually found very fmall, its moft common fize being equal to that of the head of the largeft fort of pins; but it is found of four, eight, or ten caracts; and fometimes, though very rare, up to twenty, thirty, or forty. It is never found of an angular or cryftalliform fharp, but always of a pebble like figure, often roundifh, fometimes oblong and much larger at one end than at the other, and in fome fort refembling a pear, and is ufually flatted on one fide. It commonly is naturally fo bright and pure on the furface, as to need no polifhing; and when its figure will admit of being fet without cutting, it is often worn in its rough ftate, and with no other than its native polifh. Our jewellers are very nice, though not perfectly determinate, in their diftinctions of this gem, knowing it, in its different degrees of colour, under three different names: the firft is fimply the ruby, the name given it in its deepeft coloured and moft perfect ftate: the fecond is the fpinel ruby; under this name they comprehend thofe rubies which are of a fomewhat lefs bright colour than the ruby fimply fo called: the third is the balafs-ruby; under this name they exprefs a pale yet a very bright ruby, with a lefs admixture of the purple tinge than in the deeper coloured one; this is of lefs value than the deeper one.

We have the true ruby only from the Eaft-Indies; and the principal mines of it are in the kingdom of Pegu and the ifland of Ceylon. We have in Europe cryftals tinged to the colour of the ruby, but they have nothing of its luftre or hardnefs. The ruby feems to owe its colour to gold, it being poffible to feparate a fmall portion of gold from the little native rubies, and alfo to give the true colour of the ruby to fictitious pafte by means of that metal.

The way of preparing a metalline colour from gold and tin, for tinging glafs of a ruby colour is, according to Shaw, as follows: Diffolve gold in aqua-regia, and dilute the fine yellow folution with a large proportion of fair water; to the mixture add a fufficient quantity of a faturated folution of tin, made alfo in aqua regia, at feveral times, and a moft beautiful red or purple-coloured powder will foon fall to the bottom of the containing glafs: decant the liquor and dry the powder, a few grains whereof being melted along with white cryftalline glafs will tinge it throughout of an extremely fine purple or ruby colour.

In M. Savary's Dict. de Commerce, we have the following table of the value of rubies, from one carat, or four grains, to ten carats:

| | l. | s. | d. |
|---|---|---|---|
| A ruby of one carat is worth | 1 | 15 | 00 |
| Of two - - - - - - | 9 | 00 | 00 |
| Of three - - - - - | 22 | 10 | 00 |
| Of four - - - - - | 33 | 15 | 00 |
| Of five - - - - - - | 45 | 00 | 00 |
| Of fix - - - - - - | 67 | 10 | 00 |
| Of feven - - - - - | 84 | 00 | 00 |
| Of eight - - - - - | 106 | 00 | 00 |
| Of nine - - - - - | 150 | 00 | 00 |
| Of ten - - - - - - | 216 | 00 | 00 |

RUBY, in heraldry, denotes the red colour wherewith the arms of noblemen are blazoned; being the fame which in the arms of others, not noble, is called gules. See the article GULES.

RUCTATION, belching, a ventofity arifing from indigeftion, and difcharging itfelf at the mouth with a very difagreeable noife. There are belches owing to repletion, and others to inanition, or emptinefs. Quincy fays hypochondriac and hyfteric perfons are particularly liable to this diforder. They are rather to be cured with proper ftomachics than carminatives and hot liquors.

RUDBECKIA, dwarf sun flower, in botany a genus of the fyngenefia-polygamia clafs of plants, the compound flower of which is radiated; but the hermaphrodite corollulæ of the difc are tubulofe and very numerous: the ftamina are five very fhort capillary filaments; and there is a fmall orbiculated feed after each of the hermaphrodite corollulæ, and are all contained in the cup, affixed to a paleaceous receptacle.

RUDDER, in navigation, a piece of timber turning on hinges in the ftern of the fhip, and which, oppofing fometimes one fide to the water and fometimes another, turns or directs the veffel this way or that. See the article Ship.

The rudder of a fhip is a piece of timber hung on the ftern pofts by four or five iron-hooks, called pintles, ferving as it were for the bridle of a fhip to turn her about at the pleafure of the fteers-man. The rudder being perpendicular; and without-fide the fhip, another piece of timber is fitted to it at right angles, which comes into the fhip, by which the rudder is managed and directed. This latter properly is called the helm or tiller; and fometimes, though improperly, the rudder itfelf. The power of the rudder is reducible to that of the lever. See the article Lever.

As to the angle the rudder fhould make with the keel, it is fhewn, that in the working of fhips, in order to ftay or bear up the fooneft poffible, the tiller of the rudder ought to make an angle of 55° with the keel. A narrow rudder is beft for a fhip's failing, provided fhe can feel it; that is, be guided and turned by it: for a broad rudder will hold much water when the helm is put over to any fide; but if a fhip have a fat quarter, fo that the water cannot come quick and ftrong to her rudder, fhe will require a broad rudder. The aft-moft part of the rudder is called the rake of the rudder.

RUDENTURE, in architecture, the figure of a rope or ftaff, fometimes plain, fometimes carved, with which the third part of the flutings of columns are frequently filled up.

There are alfo rudentures in relievo laid on the naked of pilafters not fluted: an inftance of which we have in the church of St. Sapienza at Rome.

RUDERATION, in building a term ufed by Vitruvius for the laying of pavment with pebbles.

To perform the ruderation it is neceffary that the ground be well beaten, to make it firm, and to prevent it from cracking; then a ftratum of little ftones are laid, to be afterwards bound together with mortar made of lime and fand. If the fand be new, its proportion may be to the lime as three to one; if dug out of old pavements or walls, as five to two. Ruderation, Daviler obferves, is alfo ufed by Vitruvius for the coarfeft and moft artlefs kind of mafonry, where a wall is as it were cobled up.

RUDIARIUS, in antiquity, a veteran gladiator who had got a difcharge from the fervice. See Gladiator.

RUDIMENTS, *rudimenta*, the firft principles or grounds of any art or fcience, called alfo the elements thereof. See the article Element.

RUDIS, a knotty rugged ftick, which the prætor among the Romans gave the gladiators as a mark of their freedom and difmiffion.

RUE, *ruta*, in botany. See Ruta.

RUELLIA, in botany, a genus of the didynamia angiofpermia clafs of plants, the corolla whereof confifts of a fingle petal: the tube is of the length of the cup, with a patulous inclined neck: the limb is quinquifid, patent, and obtufe, with the two upper lacinii more reflex than the reft: the fruit is a round capfule, acuminated on both fides, of the length of the cup, femibilocular and bivalve: the feeds being a few in number, are roundifh and compreffed.

RUFF, in ichthyology, a fpecies of the perca, with a cavernous head, and only one fin on the back. See Perca.

The ufual fize to which this fpecies arrives is four or five inches, though fometimes it will grow longer: the head in its general form is compreffed, but flatted a little between the eyes; the beak is fomewhat acute; the breaft and belly are flatted; the eyes are large, and of a variety of colours; the teeth are fmall but numerous, there is a row of them in each jaw, and on the anterior part of the palate there is a number of teeth, fo

minute that they can ſcarce be ſeen; the lateral line is ſomewhat crooked; the colour of the fiſh is a browniſh yellow with a number of black ſpots; the fin on the back has twenty-eight rays, the pectoral-fins eighteen, and the belly-fins each ſix.

RUFF, in ornithology, a ſpecies of the tringa, with a granulated face, and a red beak and legs: it is about the bigneſs of the common jack daw. See the article TRINGA.

The head is round, and covered with a large tuft of feathers, except the anterior part, which is naked, but the ſkin is elegantly granulated with ſmall red tubercles, diſpoſed regularly and cloſely over it; the eyes are large, their aſpect bright and piercing, and their iris of a bright hazel-colour; the beak is moderately long and obtuſe at the end, it is of a bright fine red at the baſe, and ſometimes all over; the upper chap is a little longer than the under one; the tongue is extended to the very top of the beak. See plate CCXXXV. fig. 3.

RUFTER-HOOD, among falconers, a plain leathern hood, large and open behind, to be worn by an hawk when ſhe is firſt drawn.

RUGEN, an iſland of the Baltic-ſea, on the coaſt of Germany, being part of the dutchy of ſwediſh Pomerania, ſeparated from the continent by a narrow channel: this iſland is thirty miles long, and near as many broad.

RUINS, a term particularly uſed for magnificent buildings fallen into decay, by length of time, and whereof there only remains a confuſed heap of materials.

RULE, *regula*, in matters of literature, a maxim, canon, or precept, to be obſerved in any art or ſcience.

The rules of philoſophizing, of reaſoning, of method, as alſo thoſe to be obſerved in logic, morality, poetry, medicine, rhetoric, &c. have been already delivered under the articles PHILOSOPHY, REASONING, &c.

RULE, in arithmetic, denotes an operation performed with figures, in order to diſcover ſums or numbers unknown.

The fundamental rules are addition, ſubtraction, multiplication, and diviſion. See the article ADDITION, &c.

But beſides theſe, there are other rules denominated from their uſe; as the rule of alligation, fellowſhip, intereſt, practice, reduction, &c. See the article ALLIGATION, &c.

RULE OF THREE, GOLDEN RULE, or RULE OF PROPORTION, is one of the moſt eſſential rules of arithmetic; for the foundation of which ſee the articles PROPORTION.

It is called the Rule of Three from having three numbers given to find a fourth; but more properly, the Rule of Proportion, becauſe by it we find a fourth number proportional to three given numbers: and becauſe of the neceſſary and extenſive uſe of it, it is called the Golden Rule. But to give a definition of it, with regard to numbers of particular and determinate things, it is the rule by which we find a number of any kind of things, as money, weight, &c. ſo proportional to a given number of the ſame things, as another number of the ſame or different things, is to a third number of the laſt kind of thing. For the four numbers that are proportional muſt either be all applied to one kind of things; or two of them muſt be of one kind, and the remaing two of another: becauſe there can be no proportion, and conſequently no compariſon of quantities of different ſpecies: as for example, of three ſhillings and four days; or of ſix men and four yards.

All queſtions that fall under this rule may be diſtinguiſhed into two kinds: the firſt contains theſe wherein it is ſimply and directly propoſed to find a fourth proportional to three given numbers taken in a certain order: as if it were propoſed to find a ſum of money ſo proportioned to one hundred pounds as ſixty four pounds ten ſhillings is to eighteen pounds ſix ſhillings and eight pence, or as forty pounds eight ſhillings is to ſix hundred weight. The ſecond kind contains all ſuch queſtions wherein we are left to diſcover, from the nature and circumſtances of the queſtion, that a fourth proportional is ſought; and conſequently, how the ſtate of the proportion, or compariſon of the term, is to be made; which depends upon a clear underſtanding of the nature of the queſtion and proportion. After the given terms are duly ordered, what remains to be done is to find a fourth proportional. But to remove all difficulties as much as poſſible, the whole ſolution is reduced to the following general rule, which contains what is neceſſary for ſolving ſuch queſtions wherein the ſtate of the proportion is given; in order to which it is neceſſary to premiſe theſe obſervations.

1. In all queſtions that fall under the following rule there is a ſuppoſition and a demand: two of the given numbers contain a ſuppoſition, upon the conditions whereof a demand is made, to which the other given term belongs; and it is therefore ſaid to raiſe the queſtion; becauſe the number ſought has ſuch a connection with it as one of theſe in the ſuppoſition has to the other. For example; if 3 yards of cloth coſt 4 l. 10 s. (here is the ſuppoſition) what are 7 yards 3 quarters worth? here is the demand or queſtion raiſed upon 7 yards 3 quarters, and the former ſuppoſition.

2. In the queſtion there will ſometimes be a ſuperfluous term; that is, a term which, though it makes a circumſtance in the queſtion, yet it is not concerned in the proportion, becauſe it is equally ſo in both the ſuppoſition and demand. This ſuperfluous term is always known by being twice mentioned either directly, or by ſome word that refers to it. Example, if 3 men ſpend 20 l. in 10 days, how much, at that rate, will they ſpend in 25 days? Here the 3 men is a ſuperfluous term, the proportion being among the other three given terms, with the number ſought; ſo that any number of men may be as well ſuppoſed as 3.

Rule. Firſt, The ſuperfluous term (if there is one) being caſt out, ſtate the other three terms thus: of the two terms in the ſuppoſition, one is like the thing ſought (that is, of the ſame kind of thing the ſame way applied); ſet that one in the ſecond or middle place; the other term of the ſuppoſition ſet in the firſt place, or on the left hand of the middle; and the term that raiſes the queſtion, or with which the anſwer is connected, ſet in the third place, or on the right hand; and thus the extremes are like one another, and the middle term like the thing ſought: alſo the firſt and ſecond terms contain the ſuppoſition, and the third raiſes the queſtion; ſo that the third and fourth have the ſame dependance or connection as the firſt and ſecond. This done,

Secondly, Make all the three terms ſimple numbers of the loweſt denominations expreſſed, ſo that the extremes be of one name. Then,

Thirdly, Repeat the queſtions from the numbers thus ſtated and reduced (arguing from the ſuppoſition to the demand) and obſerve whether the number ſought ought to be greater or leſſer than the middle term, which the nature of the queſtion, rightly conceived, will determine; and accordingly, multiply the middle term by the greater or leſſer extreme, and divide the product by the other, the quote is like the middle term, and is the complete anſwer, if there is no remainder; but if there is, then,

Fourthly, reduce the remainder to the denomination next below that of the middle term, and divide by the ſame diviſor, the quotient is another part of the anſwer in this new denomination. And if there is here alſo a remainder, reduce it to the next denomination, and then divide. Go on thus to the loweſt denomination, where, if there is a remainder, it muſt be applied fraction-wiſe to the diviſor; and thus you will have the complete anſwer in a ſimple or mixed number.

Note, If any of the dividends is leſs than the diviſor, reduce it to the next denomination, and to the next again, till it be greater than, or equal to, the diviſor.

EXAMPLES.

Queſt. I. If 3 yards of cloth coſt 8 s. what is the price of 15 yards? Anſw. 40 s. or 2 l.

Work.
yrds. s. yds.
3—8—15
15
3|120|40 s.

Explanation. 3 yards and 8 s. contain the ſuppoſition, and 8 s. is like the thing ſought; therefore 8 s. is the middle term, and yards on the left: then the demand ariſes upon 15 yards, and therefore it is on the right. Again, from the nature of the queſtion it is plain, that 15 yards require more than 3 yards, *i. e.* the anſwer muſt be greater than the middle term; wherefore 8 s. is to be multiplied by 15 yards; the product is 120 s. which divided by 3 yards, quotes 40 s. without a remainder; ſo 40 s. or 2 l. is the number ſought.

Queſt. II. If 4 lb. of ſugar coſt 2 s. 9 d. what is the value of 18 lb.? Anſwer, 12 s. 4 $\frac{1}{2}$ d.

Work.
lb. s. d. lb.
4—2 : 9—18
12
33 d.
18
264
33
4|594|148 d.
2
4
4|8|2 farthings.

Expl. The ſuppoſition is in 4 lb. and 2 s. 9 d. this laſt term being like the thing ſought, which is connected with 18 lb. wherefore the terms are ſtated according to the rule: then the middle term being mixed, it is to be reduced to pence; and then argue thus; if 4 lb. coſt 33 d. 18 lb. muſt coſt more; therefore multiply 33 d. by 18 lb.

18 lb. and divide their product by 4; the quotient is 148 d. and 2 remains, which is to be reduced to farthings, and the product divided by the former quotient, gives 2; so the answer is 148 d. 2 farthings, or 12 s. 4 $\frac{1}{2}$ d. because 148 d. is by reduction, 12 s. 4 d.

Queſt. III. What is the price of 50 l. of tobacco, when 32 lb. 12 oz. coſt 4 l. 10 s.? Anſw. 6 l. 17 s. 4 $\frac{3}{4}$ d.

Work.

lb. oz. l. s. lb. oz. s. oz.
32 : 12—4 : 10—50 524—90—800
16 20 16 800
194 90 300 524|72000|137 s.
33 50 524
524 800 1960
1572
3880
3668
Remainder 212
12
524|2544|4 d.
2096
Remainder 448
4
524|1792|3 $\frac{220}{524}$ q.
1572
220

Queſt. IV. What are 5 yards of ribband worth, whereof 63 yards 2 quarters coſt 5 l.? Anſw. 7 s. 10 d. 1 $\frac{242}{254}$ q.

Work.
yds. qrs. l. yds.
63 : 2—5—5
4 4
254qs.—5—20qrs.
20
100
20
254|2000|7 s.
1778
Rem. 222
12
254|2664|10 d.
254
124
4
254|496|1 $\frac{242}{254}$ q.
254
242

Explanation. The terms ſtated, and reduced according to the rule, I find the anſwer ought to be leſs than the middle term; therefore I multiply 5 l. by 20 quarters, but the product is leſs than the diviſor; and ſo it is to be reduced to ſhillings, which makes 2000 s. this divided by 254, quotes 7 s. The reſt of the work is plain.

Queſt. V. What time will 7 men be boarded for 25 l. when 3 men paid 25 l. for 6 months? Anſw. 2 months 16 days, reckoning 28 days to 1 month.

Work.
men. mths. men.
3——6——7
3
7|18|2 months.
14
Rem. 4
28
7|112|16 days.

Explanation. The 25 l. is a ſuperfluous number; then the ſuppoſition is in the 3 men and 6 months, and the demand regards the 7 men: the terms being all ſimple, you are to argue thus; if 3 men are boarded 6 months for 25 l. (or any ſum), 7 men will be boarded for the ſame a ſhorter time: therefore multiply 6 months by 3, and divide the product 18 by 7, whereby the anſwer is found to be 2 months and 16 days.

Queſt. VI. If the carriage of 3 hundred weight coſt 10 s. for 40 miles, how much ought to be carried for the ſame price 25 miles and 3 quarters? Anſw. 4 cwt. 2 qr. 17 $\frac{97}{103}$ lb.

Work.
M. Cwt. M. qr.
40—3—25 : 3
4 4
160—3—103
160
103|480|4 Cwt.
412
Rem. 68
4
103|272|2 qrs.
206
Rem. 66
28
528
132
103|1848|17 $\frac{97}{103}$ lb.
103
818
721
97

Explanation. The ſuperfluous number here is 10 s. and from the other three terms ſtated and reduced, it is argued thus; if 3 Cwt. is carried 160 quarters of a mile for 10 s. then a greater weight will be carried for the ſame price 103 qrs. of a mile; therefore multiply 3 by 160, and divide the product 480 by 103, the anſwer is 4 Cwt. 2 quarters 17 $\frac{96}{103}$ lb.

Note. The firſt four queſtions are what is called the rule of three direct, that is, where the third term being greater or leſſer than the firſt, requires that the anſwer alſo be greater or leſſer than the ſecond term. The two laſt queſtions are of the rule of three indirect, or reverſe; where the third term being greater

lesser than the first, requires the fourth contrarily lesser or greater than the second. But we have comprehended both in one general rule. And from this observation may be learned what questions are of either kind.

Rule, in a monastic sense, a system of laws or regulations, whereby religious houses are governed, and which the religious make a vow, at their entrance, to observe. Such are the rules of the augustins, benedictins, carthusians, franciscans, &c. See Augustins, &c.

Rules *of Court*, in law, are certain orders made, from time to time, in the courts of law, which attornies are bound to observe, in order to avoid confusion; and both the plaintiff and defendant are at their peril also bound to pay obedience to rules made in court relating to the cause depending between them.

It is to be observed, that no court will make a rule for any thing that may be done in the ordinary course; and that if a rule be made, grounded upon an affidavit, the other side may move the court against it, in order to vacate the same, and thereupon shall bring into court a copy of the affidavit and rule. On the breach and contempt of a rule of court an attachment lies; but it is not granted for disobedience to a rule when the party has not been personally served; nor for disobeying a rule made by a judge in his chamber, which is not of force to ground a motion upon, unless the same be entered.

A rule of court is granted every day the courts at Westminster sit, to prisoners of the king's bench, or fleet, prisons, to go at large about their private affairs.

Rule, or Ruler, an instrument of wood or metal, with several lines delineated on it, of great use in practical mensuration. When a ruler has the lines of chords, tangents, sines, &c. it is called a plane scale. See the article Scale.

The carpenter's joint-rule is an instrument usually of box, &c. twenty-four inches long, and one and a half broad; each inch being subdivided into eight parts. On the same side with these divisions, is usually added Gunter's line of numbers. On the other side, are the lines of timber and board measure; the first beginning at 82, and continued to 36, near the other end; the latter is numbered from 7 to 16, 4 inches from the other end.

*Use of the carpenter's joint* Rule. The application of the inches, in measuring lengths, breadths, &c. is obvious. That of the Gunter's line, see under the article Gunter's Line.

The use of the other side is all we need here meddle with: 1. The breadth of any surface, as board, glass, &c. being given, to find how much in length makes a square foot. Find the number of inches the surface is broad, in the line of board measure, and right against it is the number of inches required. Thus, if the surface were eight inches broad, eighteen inches will be found to make a superficial foot. Or more readily thus: Apply the rule to the breadth of the board, or glass, that end, marked 36, being equal with the edge, the other edge of the surface will shew the inches, and quarters of inches, which go to a square foot. 2. Use of the table at the end of the board-measure. If a surface be one inch broad, how many inches long will make a superficial foot? look in the upper row of figures for one inch, and under it in the second row is twelve inches, the answer to the question. 3. Use of the line of timber-measure. This resembles the former; for having learned how much the piece is square, look for that number on the line of the timber-measure; the space thence to the end of the rule is the length which, at that breadth, makes a foot of timber. Thus, if the piece be nine inches square, the length necessary to make a solid foot of timber, is 21 $\frac{1}{3}$ inches. If the timber be small, and under nine inches square, seek the square in the upper rank of the table, and immediately under it is the feet and inches that make a solid foot. If the piece be not exactly square, but broader at one end than the other the method is to add the two together, and take half the sum for the side of the square. For round timber the method is to girt it round with a string, and to allow the fourth part for the side of the square; but this method is erroneous, for hereby you lose nearly one fifth of the true solidity; though this is the method at present practised in buying and selling timber.

The mason's rule is twelve or fifteen feet long, in order to be applied under the level to regulate the courses, and make the piedroits equal, &c.

*Everard's sliding* Rule, has already been described under the article Gauging.

*Coggeshal's sliding* Rule, is chiefly used for measuring the superficies and solidity of

of timber, &c. It confifts of two rulers, each a foot long, one of which flides in a groove made along the middle of the other, as reprefented in plate CCXXXIV. fig. 4.

On the fliding fide of the rule are four lines of numbers, three whereof are double; that is, are lines to two radiufes; and one, a fingle broken line of numbers: the three firft, marked A, B, C, are figured 1, 2, 3, &c. to 9; then 1, 2, 3, &c. to 10; their conftruction, ufe, &c. being the fame as thofe of Everard's fliding rule. The fingle line, called the girt-line, and marked D, whofe radius is equal to the two radiufes of any of the other lines, is broke for the eafier meafurement of timber, and figured 4, 5, 6, 7, 8, 9, 10, 20, 30, &c. From 4 to 5 it is divided into ten parts, and each tenth fubdivided into 2, and fo on, from 5 to 6, &c.

On the backfide of the rule are, 1. A line of inch-meafure, from 1 to 12; each inch being divided and fubdivided. 2. A line of foot meafure, confifting of one foot, divided into 100 equal parts, and figured 10, 20, 30, &c. The back part of the fliding piece is divided into inches, halves, &c. and figured from 12 to 24; fo that when drawn wholly out, there may be a meafure of two feet.

*Ufe of Coggefhal's* RULE *for meafuring plane fuperficies*. 1. To meafure a fquare: fuppofe, for inftance, each of the fides 5 feet; fet 1 on the line B, to 5 on the line A; then againft 5 on the line B is 25 feet, the content of the fquare on the line A. 2. To meafure a long fquare. Suppofe the longeft fide 18 feet, and the fhorteft 10; fet 1 on the line B, to 10 on the line A; then againft 18 feet, on the line B, is 180 feet, the contents on the line A. 3. To meafure a rhombus. Suppofe the fide 12 feet, and the length of a perpendicular let fall from one of the obtufe angles, to the oppofite fide, 9 feet; fet 1 on the line B, 12, the length of the fide on the line A; then againft 9, the length of the perpendicular on the line B, is 108 feet, the content. 4. To meafure a triangle. Suppofe the bafe 7 feet, and the length of the perpendicular let fall from the oppofite angle to the bafe 4 feet; fet 1 on the line B, to 7 on the line A; then againft half the perpendicular, which is 2 on the line B, is 14 on the line A, for the content of the triangle. 5. To find the content of a circle, its diameter being given. Suppofe the diameter 3.5 feet; fet 11 on the girt line D, to 95 on the line C; then againft 3.5 feet on D, is 9.6 on C, which is the content of the circle in feet. 6. To find the content of an oval or ellipfis. Suppofe the longeft diameter 9 feet, and the fhorteft 4. Find a mean proportional between the two, by fetting the greater 9 on the girt line, to 9 on the line C; then againft the lefs number 4 on the line C is 6, the mean proportional fought. This done, find the content of a circle, whofe diameter is 6 feet; this, when found, by the laft article, will be equal to the content of the ellipfis fought.

*Ufe of Coggefhal's* RULE, *in meafuring timber*. 1°. To meafure timber the ufual way. Take the length in feet, half feet, and, if required, quarters; then meafure half way back again; then girt the tree with a fmall cord or line; double this line twice very evenly, and meafure this fourth part of the girt or perimeter, in inches, halves, and quarters The dimenfions thus taken, the timber is to be meafured as if fquare, and the fourth of the girt taken for the fide of the fquare, thus; fet 12 on the girt line D, to the length in feet on the line C; then againft the fide of the fquare, on the girt-line D, taken in inches, you have, on the line C, the content of the tree in feet. For an inftance: fuppofe the girt of a tree, in the middle, be 60 inches, and the length 30 feet, to find the content, fet 12 on the girt-line D, and 30 feet on the line C; then againft 15, one fourth of 60, on the girt-line D, is 46.8 feet, the content on the line C. If the length fhould be 9 inches, and the quarter of the girt 35 inches; here, as the length is beneath a foot, meafure it on the line of foot-meafure, and fee what decimal part of a foot it makes, which you will find .75. Set 12. therefore, on the girt-line, to 75 on the firft radius of the line C, and againft 35 on the girt-line is 64 feet on C, for the content. 2°. To meafure round timber the true way. The former method, though that generally in ufe, is not quite juft. To meafure timber accurately, inftead of the point 12 on the girt-line, ufe another, *viz.* 10.635; at which there fhould be placed a center-pin. This 10.635 is the fide of a fquare equal to a circle, whofe diameter is 12 inches. For an inftance: fuppofe the length 15 feet, and ¼ of the girt 42 inches, fet the point 10.635 to 15, the length;

length; then againſt 42 on the girt-line is 233 feet for the content ſought; whereas by the common way, there ariſes only 184 feet. In effect, the common meaſure is only to the true meaſure, as 11 to 14. 3°. To meaſure a cube. Suppoſe the ſides to be 6 feet each; ſet 12 on the girt-line D, to 6 on C; then againſt 72 inches (the inches 6 feet) on the girt-line, is 216 feet on C, which is the content required. 4°. To meaſure unequally-ſquared timber; that is where the breadth and depth are not equal. Meaſure the length of the piece, and the depth (at the end) in inches: then find a mean proportional between the breadth and depth of the piece. This mean proportional is the ſide of a ſquare, equal to the end of the piece; which found, the piece may be meaſured as ſquare timber. For an inſtance: let the length of the piece of timber be 13 feet, the breadth 23 inches, and the depth 13 inches; ſet 23 on the girt-line D, to 23 on C; then againſt 13 on C is 17.35 on the girt-line D, for the mean proportional. Again, ſetting 12 on the girt-line D, to 13 feet, the length of the line C; againſt 17.35 on the girt-line is 27 feet, the content. 5°. To meaſure taper timber. The length being meaſured in feet, note one-third of it; which is found thus: ſet 3 on the line A, to the length on the line B; then againſt 1 on A is the third part on B: then, if the ſolid be round, meaſure the diameter at each end in inches, and ſubtract the leſs diameter from the greater; add half the difference to the leſs diameter; the ſum is the diameter in the middle of the piece. Then ſet 13.54 on the girt to the length of the line C, and againſt the diameter in the middle on the girt-line is a fourth number on the line C. Again, ſet 13.54 on the girt-line to the third part of the length on the line C; then againſt half the difference on the girt-line is another fourth number on the line C; theſe two fourth numbers, added together, give the content. For an inſtance: let the length be 27 feet (one third whereof is 9) the greater diameter 22 inches, and the leſſer 18; the ſum of the two will be 40, their difference 4, and half the difference 2, which, added to the leſs diameter, gives 20 inches for the diameter in the middle of the piece. Now ſet 13.54 on the girt-line, to 27 on the line C, and againſt 20 on D is 58.9 feet. Again, ſet 13.54 of the girt line to 9 on the line C; and againſt 2 on the girt-line (repreſented by 20) is .196 parts; therefore, by adding 58.9 feet to .196 feet, the ſum is 59.096 feet, the content.

If the timber be ſquare, and have the ſame dimenſions; that is, the length 27 feet, the ſide of the greater end 22 inches, and that of the leſſer 18 inches; to find the content, ſet 12 on the girt-line to 27, the length on the line C, and againſt 20 inches, the ſide of the mean ſquare on the girt-line, is 75.4 feet. Again, ſet 12 on the girt-line to 9 feet, one-third of the length, on the line C, and againſt 2 inches, half the difference of the ſides of the ſquares of the ends on the girt-line, is .25 parts of a foot; both together make 75.65 feet, the content of the ſolid.

The girt or circumference of a tree, or round piece of timber given; to find the ſide of the ſquare within, or the number of inches of a ſide, when the round timber is ſquared. Set 10 on A to 9 on B, then againſt the girt on A are the inches for the ſide of a ſquare on the line B.

RUM, a ſpecies of brandy, or vinous ſpirit, diſtilled from ſugar-canes. See Brandy, Distillation, and Spirit.

Rum, according to Dr. Shaw, differs from ſimple ſugar-ſpirit, in that it contains more of the natural flavour or eſſential oil of the ſugar-cane; a great deal of raw juice and parts of the cane itſelf being often fermented in the liquor, or ſolution, of which the rum is prepared. The unctuous or oily flavour of rum is often ſuppoſed to proceed from the large quantity of fat uſed in boiling the ſugar; which fat, indeed, if coarſe, will uſually give a ſtinking flavour to the ſpirit, in our diſtillations of the ſugar liquor, or waſh, from our refining ſugar-houſes; but this is nothing of kin to the flavour of the rum, which is really the effect of the natural flavour of the cane.

The method of making rum is this: When a ſufficient ſtock of the materials is got together, they add water to them, and ferment them in the common method, though the fermentation is always carried on very ſlowly at firſt; becauſe at the beginning of the ſeaſon for making rum in the iſlands, they want yeaſt, or ſome other ferment to make it work; but by degrees, after this they procure a ſufficient quantity of the ferment, which riſes up as a head to the liquor in the operation, and thus they are able afterwards

wards to ferment and make their rum with a great deal of expedition, and in large quantities.

When the wash is fully fermented, or to a due degree of acidity, the distillation is carried on in the common way, and the spirit is made up proof: though sometimes it is reduced to a much greater strength, nearly approaching to that of alcohol or spirit of wine, and it is then called double distilled rum. It might be easy to rectify the spirit, and bring it to much greater purity than we usually find it to be of; for it brings over in the distillation a very large quantity of the oil; and this is often so disagreeable, that the rum must be suffered to lie by a long time to mellow before it can be used; whereas, if well rectified, it would grow mellow much sooner, and would have a much less potent flavour.

The best state to keep rum in, both for exportation and other uses, is doubtless that of alcohol, or rectified spirit. In this manner it would be transported in one half the bulk it usually is, and might be let down to the common proof-strength with water when necessary: for the common use of making punch, it would likewise serve much better in the state of alcohol; as the taste would be cleaner; and the strength might always be regulated to a much greater exactness than in the ordinary way.

The only use to which it would not so well serve in this state, would be the common practice of adulteration among our distillers; for when they want to mix a large portion of cheaper spirit with the rum, their business is to have it of the proof strength, and as full of the flavouring oil as they can, that it may drown the flavour of the spirits they mix with it, and extend its own. If the business of rectifying rum was more nicely managed, it seems a very practicable scheme to throw out so much of the oil, as to have it in the fine light state of a clear spirit, but lightly impregnated with it; in this case it would very nearly resemble arrac, as is proved by the mixing a very small quantity of it with a tasteless spirit, in which case the whole bears a very near resemblance to arrac in flavour.

Rum is usually very much adulterated in England; some are so barefaced as to do it with malt-spirit; but when it is done with molasses-spirit, the tastes of both are so nearly allied that it is not easily discovered. The best method of judging of it is, by setting fire to a little of it; and when it has burnt away all the inflammable part, examining the phlegm both by the taste and smell.

Rum, on importation, pays a duty of 4s. $\frac{80\frac{5}{21}}{100}$ d. the gallon.

RUMB, or RHUMB. See RHUMB.

RUMELIA, in geography, the same with antient Greece, now a part of Turky in Europe. See TURKY.

RUMEN, in comparative anatomy, the paunch, or first stomach of such animals as chew the cud, thence called ruminant animals.

The rumen is by far the largest of all the stomachs, and in it the whole mass of crude aliments, both solid and liquid, lies and macerates, to be thence transmitted to the mouth to be again chewed, comminuted, and fitted for farther digestion in the other ventricles. See the article DIGESTION.

The ruminant animals, Mr. Ray observes, are all hairy quadrupeds, viviparous, and have four stomachs; they also want the dentes primores, or broad teeth in the fore part of the upper jaw, and are furnished with that kind of fat called suet, sebum. See QUADRUPED.

We even find instances of ruminating men, particularly of one at Bristol, of whom Dr. Slare gives the following account, in Phil. Transf. n° 193. He would begin to chew his meat over again within a quarter of an hour after his meals, if he drank upon them; if not, it was somewhat longer: this chewing after a full meal lasted about an hour and an half. The victuals, upon their return into the mouth, tasted somewhat more pleasant than at first; and liquids, as broths and spoon-meats, returned all one as dry and solid food; and he always observed, that if he eat variety of things, what he swallowed first, would again come up first to be chewed; also if this faculty intermitted at any time, it portended sickness, and he was never well till it returned again.

RUMEX, in botany, a genus of the hexandria-tryginia class of plants, the flower of which consists of three connivent petals, of an oval figure: the seed is single, triquetrous, and contained in the corolla.

To this genus, among other species, belong

long rhubarb, bloody dock, common sorrel, &c. See the articles RHUBARB, DOCK, and SORREL.

RUMFORD, a market-town of Essex, ten miles east of London.

RUMMAGE, in the sea-language, signifies to clear a ship's hold, or to remove goods from one place of it to another.

RUMPFIA, in botany, a genus of the triandria-monogynia class of plants, the corolla of which consists of three oblong obtuse, and equal petals; its fruit is a coriaceous and turbinated drupe, with three furrows; and inclosing an oval trilocular nut, with a single triquetrous kernel in each cell.

RUMSEY, a market town of Hampshire, nine miles south-west of Winchester.

RUN, in the sea-language, denotes so much of a ship's hull, as is under water.

RUNDLE, or ROUNDLE, in heraldry, the same with pellet. See PELLET.

RUNDLET, or RUNLET, a small vessel, containing an uncertain quantity of any liquor, from three to twenty gallons.

RUNGS, in a ship, the same with the floor or ground timbers, being the timbers which constitute her floor, and are bolted to the keel, whose ends are rung-heads.

RUNG-*heads*, in a ship, are made a little bending, to direct the sweep or mold of the futtocks and navel timbers: for here the lines, which make the compass and bearing of a ship, do begin.

RUNIC, a term applied to the language and letters of the antient Goths, Danes, and other northern nations.

RUNNER, in the sea language, a rope belonging to the garnet, and to the two bolt-tackles. It is reeved in a single block, joined to the end of a pennant, and has at one end a hook to hitch into any thing, and at the other end a double block, into which is reeved the fall of the tackle, or the garnet, by which means it purchases more than the tackle would without it.

RUNNET, or RENNET, the acid juice found in the stomachs of calves that have fed on nothing but milk, and are killed before the digestion is perfect.

RUNNING *of goods*, a clandestine landing of goods, without paying the legal customs or duties for the same.

RUNNING ROPES. See ROPE.

RUNNING, in antiquity, made one of the exercises performed in the pentathlon or quinquertium. See PENTATHLON.

This exercise was in so great esteem among the antient Greeks, that such as prepared themselves for it, thought it worth their while to burn or parch their spleen, because it was believed to be an hindrance to them. Indeed, all those exercises, that conduced to fit men for war, were more especially valued; and that swiftness was esteemed such in an eminent degree, appears from Homer's giving his hero the epithet of πόδας ὠκὺς Ἀχιλλεύς.

RUPEE, ROUPIA, or ROUPIAS, names of a gold and silver coin, current in the East-Indies. See COIN.

RUPELMONDE, a town of Flanders, situated on the river Scheld, six miles south of Antwerp. See RUPPLE.

RUPERT'S DROPS, a sort of glass-drops with long and slender tails, which burst to pieces on the breaking off those tails in any part, said to have been invented by prince Rupert, and therefore called after his name. This surprising phænomenon is supposed to rise from hence, that while the glass is in fusion, or in a melted state, the particles of it are in a state of repulsion; but being dropped into cold water, it so condenses the particles in the external parts of their superficies, that they are easily reduced within the power of each others attraction, and by that means they form a sort of hard case, which keeps confined the before-mentioned particles in their repulsive state; but when this outer-case is broke, by breaking off the tail of the drop, the said confined particles have then a liberty to exert their force, which they do by bursting the body of the drop, and reducing it to a very peculiar form of powder.

RUPERT-FORT, a settlement belonging to the Hudson's-Bay company, situated at the bottom of the said bay, in west long. 80°, north lat. 51°.

RUPICAPRA, in zoology, the CHAMOIS-GOAT. See CHAMOIS and GOAT.

RUPPIA, in botany, a genus of the tetrandria-tetragynia class of plants, without any flower-petals: there are no stamina, the antheræ being sessile: the fruit consists of four oval, cortical substances, pointed, and standing on the elongated styles, and in each is contained a single roundish seed.

RUPPLE, a river of Brabant, which, formed by Senne, Demer, and Dyle, falls into the Scheld at Rupelmonde.

RUPTURE, in surgery, the same with hernia. See the article HERNIA.


BIBLIOTECA UNIVERSITARIA
SEVILLA




T. Jefferys sculp.

RURAL, or RUSTIC, in general, denotes something that relates to the country.

RURAL DEAN, in church-hiftory. See the article DEAN.

RUSCUS, BUTCHER'S BROOM, in botany, a plant of the dioecia-fyngenefia clafs, with a globofe monopetalous flower; and a globofe trilocular berry for its fruit, with two feeds of the fame fhape in each cell. The root of this plant is one of the five aperient roots of the fhops; being efteemed a powerful attenuant and refolvent, and therefore good in all chronic cafes and obftructions of the vifcera, as alfo to promote urine.

RUSH, *juncus*, in botany. See JUNCUS.

RUSMA, in the materia medica, the fame with fory. See the article SORY.

RUSSIA, or MUSCOVY, a large empire, comprehending a vaft extent of country, in the moft northerly parts of Europe and Afia, from 24° to 130°, eaft long. and between 45° and 72° north lat.

Its capital cities are Mofcow and Peterfburg. See the articles MOSCOW and PETERSBURG.

RUSSIA-COMPANY, in commerce. See the article COMPANY.

RUST *of a metal*, the flower or calx thereof, procured by corroding and diffolving its fuperficial parts by fome menftruum. Water is the great inftrument or agent in producing ruft; and hence oils, and other fatty bodies, fecure metals from ruft; water being no menftruum to oil, &c. and therefore not able to make its way through it.

All metals are liable to ruft, even gold itfelf, if expofed to the fumes of fea falt.

RUST, or BLIGHT *of Corn*. See BLIGHT.

RUSTIC, in architecture, implies a manner of building in imitation of nature, rather than according to the rules of art.

RUSTIC WORK, is where the ftones in the face, &c. of a building, inftead of being fmooth, are hatched, or picked with the point of a hammer.

RUSTIC ORDER, that decorated with ruftic quoins, ruftic work, &c.

RUSTRE, in heraldry, a bearing of a diamond-fhape, pierced through in the middle with a round hole. See plate CCXXXIII. fig. 4.

RUT, in hunting, the venery or copulation of deer. See DEER.

RUTA, RUE, in botany, a genus of the octandria-monogynia clafs of plants, with a rofaceous flower, ufually confifting of four patent and hollow petals; its fruit confifts of four capfules affixed to an axis, or rather one gibbous capfule, with four lobes, and as many cells, in which are inclofed a great many kidney-fhaped and angular feeds. See plate CCXXXV. fig. 1.

The dried herb is much ufed in medicine, by way of infufion; being efteemed an excellent alexipharmic and cephalic, and accordingly prefcribed in the fmall-pox, meafles, and hyfteric and nervous cafes; as alfo in peripneumonies and pleurifies, to ftrengthen the ftomach, and to prevent the return of habitual colics.

*Goat* RUE, *galega*, a plant of the diadelphia-decandria clafs, with a papilionaceous flower, and a long cylindric pod for its fruit.

It has been accounted a good fudorific, but is little ufed in the prefent practice.

*Meadow* RUE, *thalictrum*. See the article THALICTRUM.

*Wall* RUE, *ruta muraria*, the fame with the adiantum album. See ADIANTUM.

*Wild* RUE, *harmala*, or *peganum*. See the article PEGANUM.

*Book of* RUTH, a canonical book of the Old Teftament, being a kind of appendix to the book of Judges, and an introduction to thofe of Samuel; and having its title from the perfon whofe ftory is here principally related. In this ftory are obfervable the antient rights of kindred and redemption, and the manner of buying the inheritance of the deceafed, with other particulars of great note and antiquity.

RUTHYN, a market-town of Denbighfhire eight miles fouth-eaft of Denbigh.

RUTICILLA, in ornithology, a bird called in englifh the redftart. See RED.

RUTILUS, in ichthyology, a fifh called in englifh the roach. See ROACH.

RUTLAND, the leaft county in England, bounded by Lincolnfhire, on the northeaft; by Northamptonfhire, on the fouth-eaft; and by Leicefterfhire, on the weft and north weft.

RUVO, a town of the kingdom of Naples, feventeen miles fouth-weft of Barri.

RYAL, or RIAL. See RIAL.

RYE, *fecale*, in botany. See SECALE.

Rye fucceeds very well on any fort of dry land, even on the moft barren gravel or fand. The farmers fow it about the beginning of September, after a fummer's fallow, in the drieft time they can. Two bufhels of feed is the quantity generally allowed to an acre of land; but if it be ground newly broken up, or if it be

ſubject to worms, they then allow a peck more to the acre. A little ſprinkling of dung, or mud, upon rye-land, will greatly advance the crop, though it is laid but half the thickneſs that it is for other corn; its produce is commonly about twenty buſhels upon an acre.

RYE, in geography, a borough and port-town of Suſſex, ſituated on a bay of the engliſh Channel, ſixty miles ſouth-eaſt of London. It ſends two members to parliament.

RYEGATE, or REYGATE. See REYGATE.

RYME, or RHYME. See RHYME.

RYPEN, a city and port-town of Jutland, in Denmark: eaſt long. 9°. north lat. 55° 30′.

RYSAGON, a name given to the caſſumunar-root. See the article CASSUMUNAR.

RYSWICK, a fine village in Holland, between the Hague and Delft, where the peace in 1697 was concluded.

RZECZICA, a city of Lithuania, in Poland, ſituated on the river Nieper, eaſt long. 30°, north lat. 53°.



# S.

S, ſ, or s, the eighteenth letter, and fourteenth conſonant of our alphabet; the ſound of which is formed, by driving the breath through a narrow paſſage between the palate and the tongue elevated near it, together with a motion of the lower jaw and teeth towards the upper; the lips being a little way open, with ſuch a configuration of every part of the mouth and larynx, as renders the voice ſomewhat ſibulous and hiſſing. Its ſound however varies, being ſtrong in ſome words, as *this*, *thus*, *&c.* and ſoft in words which have a final e, as *muſe*, *wiſe*, *&c.* It is generally doubled at the end of words, whereby they become hard and harſh, as in *kiſs*, *loſs*, *&c.* In ſome words it is ſilent, as *iſle*, *iſland*, *viſcount*, *&c.* In writing or printing, the long character ſ, is uſed at the beginning and middle of words, but the ſhort s, at the end.

In abbreviations, S ſtands for *ſocietas* or *ſocius*; as, R. S. S. for *regiæ ſocietatis ſocius*, i. e. fellow of the royal ſociety. In medicinal preſcriptions, S. A. ſignifies *ſecundum artem*, i. e. according to the rules of art; and in the notes of the antients, S ſtands for *Sextus*; SP. for *Spurius*; S C. for *ſenatus conſultum*; S. P. Q. R. for *ſenatus populuſque Romanus*; S. S. S. for *ſtratum ſuper ſtratum*, i. e. one layer above another alternately; S. V. B. E. E. Q. V. for *ſi vales bene eſt, ego quoque valeo*, a form uſed in Cicero's time, in the beginning of letters.

Uſed as a numeral, S antiently denoted ſeven; in the italian muſic, S ſignifies ſolo; and in books of navigation, S ſtands for ſouth; S. E. for ſouth-eaſt; S. W. for ſouth-weſt; S. S. E. for ſouth ſouth-eaſt; S. S. W. for ſouth ſouth-weſt, *&c.* See COMPASS.

SABA, one of the Caribbee-iſlands, ſubject to the Dutch; weſt long. 63°, north lat. 18°.

SABÆANS, in church-hiſtory, a ſet of idolaters, much antienter than the jewiſh law.

In the early ages of the world, idolatry was divided between two ſects; the worſhippers of images called ſabæans, or ſabians, and the worſhippers of fire called magi. See the article MAGI.

The ſabæans began with worſhipping the heavenly bodies, which they fancied were animated by inferior deities. In the conſecration of their images, they uſed many incantations to draw down into them from the ſtars thoſe intelligences, for whom they erected them, whoſe power and influence they held afterwards dwelt in them. This religion, it is ſaid, firſt began among the Chaldæans, with their knowledge in aſtronomy: and from this it was, that Abraham ſeparated himſelf, when he came out of Chaldæa. From the Chaldæans it ſpread all over the eaſt; and from thence to the Grecians, who propagated it to all the nations of the known world. The remainder of this ſect ſtill ſubſiſts in the

eaſt,

east, and pretend to derive their name from Sabius a son of Seth; and among the books in which the doctrines of this sect are contained, they have one which they call the book of Seth, and which they pretend was written by that patriarch.

SABBATH, or the day of rest, a solemn festival of the Jews, on the seventh day of the week, or Saturday, beginning from sun-set on Friday, to sun-set on Saturday.

The observation of the Sabbath began with the world: for God having employed six days in its creation, appointed the seventh, as a day of rest to be observed by man, in commemoration of that great event. On this day the Jews were commanded to abstain from all labour, and to give rest to their cattle. They were not allowed to go out of the city farther than two thousand cubits, or about a mile; a custom which was founded on the distance of the ark from the tents of the Israelites, in the wilderness, after their leaving Egypt; for being permitted to go, even on the sabbath-day, to the tabernacle to pray, they from thence inferred, that the taking a journey of no greater length, though on a different account, could not be a breach of the sabbatical rest.

As the seventh day was a day of rest to the people, so was the seventh year to the land; it being unlawful in this year to plow or sow, and whatever the earth produced, belonged to the poor; this was called the sabbatical year. The Jews, therefore, were obliged, during the six years, and more especially the last, to lay up a sufficient store for the sabbatical year.

The modern, as well as the antient, Jews, are very superstitious in the observance of the sabbath; they carry neither arms, nor gold, nor silver about them, and are permitted neither to touch these, nor a candle, nor any thing belonging to the fire; on which account they light up lamps on Friday, which burn till the end of the sabbath.

There is at present a sect of baptists called sabbatarians, from their observing the seventh day of the week, as a day set apart for the worship of God: they attempt to justify this practice by alledging that the jewish sabbath was never abrogated in the New Testament; and that where God has given a command, it is our duty to observe it till he has abrogated or altered it by a new command. See the article SUNDAY.

SABELLIANS, a sect of christians of the IIId. century, that embraced the opinions of Sabellius, a philosopher of Egypt, who openly taught that there is but one person in the Godhead.

The sabellians maintained, that the Word and the Holy Spirit are only virtues, emanations, or functions of the Deity; and held, that he who is in heaven is the father of all things, descended into the virgin, became a child, and was born of her as a son; and that having accomplished the mystery of our salvation, he diffused himself on the apostles in tongues of fire, and was then denominated the Holy Ghost. This they explained by resembling God to the sun, the illuminative virtue or quality of which was the Word, and its warming virtue the Holy Spirit. The Word, they taught, was darted, like a divine ray, to accomplish the work of redemption; and that, being reascended to heaven, the influences of the Father were communicated after a like manner to the apostles.

SABINA, SAVIN, in botany. See SAVIN.

SABINA, a province of Italy, in the pope's territories, bounded by Umbria on the north, by Naples on the east, by the Campania of Rome on the south, and by St. Peter's Patrimony on the west.

SABLE, or SABLE ANIMAL, in zoology, the brown mustela with grey ears, very like the common weasel in form, but equal to the polecat in size: the fur of this creature is very thick and deep, and remarkably fine and glossy. It is a native of the northern parts of Europe; and its fur is valued at a very high rate. See MUSTELA, and WEASEL.

SABLE, in heraldry, denotes the colour black, in coats of arms belonging to gentlemen; but in those of noblemen it is called diamond; and in those of sovereign princes, saturn. See COLOUR. It is expressed in engraving by perpendicular and horizontal hatches crossing one another, as represented in pl. CCXXXV. fig. 5.

SABLE-MOUSE, a name given to the norway rat. See NORWAY RAT.

SABLE, in geography, a town of Orleanois in France, twenty miles north of Angers.

SABLUSTAN, a province of Persia, which, comprehending Gaur and Candahor, is bounded by Chorassan on the north, by India on the east, and by Sigistian on the south.

SABOT, a kind of wooden ſhoe, much wore by the peaſants in France. See the article CALIGA.

SABRE, a kind of ſword or ſcimiter, with a very broad and heavy blade, thick at the back, and a little falcated or crooked towards the point: it is the ordinary weapon worn by the Turks, who are ſaid to be very expert in the uſe of it.

SABURRÆ, GRITTS, in natural hiſtory, a genus of foſſils, found in minute maſſes, forming together a kind of powder, the ſeveral particles of which are of no determinate ſhape, nor have any tendency to the figure of cryſtal, but ſeem rudely broken fragments of larger maſſes; not to be diſſolved or diſunited by water, but retaining their figure in it, and not cohering by means of it into a maſs; conſiderably opake, and in many ſpecies fermenting with acids; often fouled with heterogene matters, and not unfrequently taken in the coarſer ſtony and mineral or metalline particles.

Gritts are of various colours, as, 1. The ſtony and ſparry gritts, of a bright or greyiſh white colour. 2. The red ſtony gritts. 3. The green ſtony gritts, compoſed of homogene ſparry particles. 4. The yellow gritt, of which there is only one ſpecies. 5. The black and blackiſh gritts, compoſed of ſtony or talcy particles.

SAC, in law, is ſaid to be an antient privilege, which the lord of a manor claims of holding his court, in cauſes of treſpaſs among his tenants, and impoſing fines for the ſame. See COURT and MANOR.

SACCADE, in the manege, is a jerk more or leſs violent, given by the horſeman to the horſe, in pulling or twitching the reins of the bridle all on a ſudden, and with one pull, and that when a horſe lies heavy upon the hand, or obſtinately arms himſelf.

This is a correction uſed to make a horſe carry well, but it ought to be uſed diſcreetly, and but ſeldom.

SACCAI, a city and port-town of Japan, ſituated on the bay of Mecao, three hundred miles ſouth-weſt of Jeddo: eaſt long. 135°, and north lat. 36°.

SACCHARUM, SUGAR, in botany. See the article SUGAR.

SACCHARUM SATURNI, SUGAR OF LEAD, is thus ordered to be made in the London Diſpenſatory: boil ceruſs with diſtilled vinegar, until the vinegar becomes ſufficiently ſweet; then filter the vinegar through paper, and after due evaporation ſet it to cryſtallize.

Some have ventured to give ſugar of lead internally, in doſes of a few grains, as a ſtyptic, in hæmorrhages, profuſe colliquative ſweats, ſeminal fluxes, the fluor albus, &c. and indeed it muſt be allowed, that it very powerfully reſtrains the diſcharge; but then it occaſions other ſymptoms, often dangerous, and ſometimes fatal, as violent colic-pains, obſtinate conſtipations, cramps, tremors, &c. ſo that its internal uſe ſeems by no means innocent.

SACCULUS, in anatomy, a diminutive of ſaccus, ſignifies a little bag: as 1. The ſacculus lachrymalis, which is a little bag, into which the puncta lachrymalia of the eye open. 2. The ſacculus cordis, or pericardium. 3. The ſacculus chyliferus, the beginning of the thoracic duct, more uſually called receptaculum chyli. 4. Sacculi adipoſi, or the adipoſe cells, &c. See the article EYE, PERICARDIUM, RECEPTACULUM, &c.

A topical application, incloſed in a linen-bag, is alſo termed ſacculus medicinalis; as is a bag filled with medicinal ſimples, and ſuſpended in a liquor, in order to make a diet-drink.

SACCUS JUGULARIS, the JUGULAR SACK, in anatomy, a receptacle formed at the termination of the internal jugular vein; the uſe of which is to bring back the blood from the ſinuſes of the dura mater, and from the brain. See the article JUGULAR and BRAIN.

SACER, in its common acceptation, ſignifies ſacred, or holy; but is alſo uſed to expreſs dreadful, horrid, or execrable: and in this laſt ſenſe Virgil calls the love of gold, *auri ſacra fames.*

It is uſed by medical writers in both theſe ſignifications: thus they call hiera picra, the ſacred tincture; a malignant kind of eryſipelas, ignis ſacer; and the epilepſy, morbus ſacer. See HIERA-PICRA, ERYSIPELAS, and EPILEPSY.

Some give the name ſacer muſculus to a muſcle called by Winſlow tranſverſo-ſpinalis lumborum: it is compoſed of ſeveral ſmall ones, and lies between the ſpinal and oblique apophyſes of the loins, reaching to the os ſacrum.

SACER, in ornithology, the engliſh name for the blue-legged falcon, with a duſky ferrugineous back. See FALCO.

This is a very large but not a very beautiful ſpecies of falco; it is of the ſize of a full

a full-grown hen. It is a very swift flier, and so bold that there is scarce any bird it will not seize upon. The head is large and rounded; the beak is short, broad at the base, and hooked at the point; the opening of the mouth is very wide, and the swallow remarkably large; the body is longer, as are also the wings and tail, than in most other species.

SACERDOTAL, something belonging to priests. See the article PRIEST.

SACK *of wool*, a quantity of wool containing just twenty-two stone, and every stone fourteen pounds. In Scotland, a a sack is twenty-four stone, each stone containing sixteen pounds.

SACK *of cotton-wool*, a quantity from one hundred and a half to four hundred weight.

SACKS *of earth*, in fortification, are canvas-bags filled with earth. They are used in making retrenchments in haste, to place on parapets, or the head of the breaches, *&c.* to repair them, when beaten down.

SACKBUT, a musical instrument of the wind-kind, being a sort of trumpet, though different from the common trumpet both in form and size: it is fit to play a bass, and is contrived to be drawn out or shortened, according to the tone required, whether grave or acute. The Italians call it trombone, and the Latins tuba ductilis.

It takes asunder in four pieces, and has frequently a wreath in the middle, which is the same tube only twice twisted, or making two circles in the middle of the instrument, by which means it is brought down one fourth lower than its natural tone: it has also two pieces or branches on the inside, which do not appear, unless drawn out by an iron-bar, and which lengthens it till it hit the tone required.

The sackbut is usually eight feet long, without reckoning the circles, and without being drawn out: when it is extended to its full length, it is usually fifteen feet; the wreath is two feet nine inches in circumference.

There are sackbuts of different sizes, distinguished by the epithets primo or I°, secundo or II°, terzo or III°, *&c.* or 1°, 2°, 3°, *&c.*

SACRA, the SACRED ARTERY, in anatomy, is a branch of the aorta descendens; which, according to Heister, sometimes descends through the os sacrum to the pelvis; sometimes arises one from each iliac, and sometimes is altogether wanting. See the article ARTERY.

There is also a vein called the vena sacra, which arises from the vena cava, just above the iliacs: it is sometimes double. See the article VEIN.

SACRAMENT, *sacramentum*, signifies, in general, a sign of a thing sacred and holy; and is defined to be an outward and visible sign of a spiritual grace. Thus there are two objects in a sacrament, the one the object of the senses, and the other the object of faith. Protestants admit only of two sacraments, baptism and the eucharist, or Lord's supper: but the roman-catholics own seven, *viz.* baptism, confirmation, the eucharist, penance, extreme unction, ordination and marriage. See the articles BAPTISM, CONFIRMATION, *&c.*

The romanists, however, by way of eminence, call the eucharist the holy sacrament. Thus to expose the holy sacrament, is to lay the consecrated host on the altar to be adored. The procession of the holy sacrament, is that in which this host is carried about the church, or about a town.

SACRAMENT was also used in the roman law for a pledge in money which both the plaintiff and defendant in a real action laid down in court to be forfeited by him who should lose the cause.

SACRAMENTARIANS, a name given by the romanists to all such as in their opinion entertain erroneous doctrines of the sacrament of the Lord's supper, and chiefly used by way of reproach to lutherans, calvinists, and other protestants.

SACRAMENTARY, an antient romish church-book, which contains all the prayers and ceremonies practised at the celebration of the sacraments.

It was wrote by pope Gelasius, and afterwards revised, corrected, and abridged by St. Gregory.

SACRED, something holy, or that is solemnly offered and consecrated to God, with benedictions, unctions, *&c.* Thus kings and priests are held sacred persons; the deaconhood, subdeaconhood, and priesthood, are all sacred orders, and impress a sacred indelible character. The sacred college is that of the cardinals.

Sacred is also applied to things belonging to God and the church. Thus churches, church-lands, ornaments, *&c.* are held saced. But in the civil law, a sacred

place

place chiefly denotes, that where a perſon deceaſed has been interred.

Sacred majeſty is applied to the emperor and the king of England; though this title has by ſome been thought blaſphemous.

SACRIFICE, a ſolemn act of religious worſhip, which conſiſted in dedicating or offering up ſomething animate or inanimate on an altar, by the hands of the prieſt, either as an expreſſion of their gratitude to the deity for ſome ſignal mercy, or to acknowledge their dependance on him, or to conciliate his favour.

The origin of ſacrifices is by ſome aſcribed to the Phœnicians, but Porphyry aſcribes it to the Egyptians, who firſt offered the firſt fruits of their grounds to the gods, burning them upon an altar of turf: thus in the moſt antient ſacrifices there were neither living creatures, nor any thing coſtly or magnificent: and no myrrh or frankincenſe. At length they began to burn perfumes: and afterwards men leaving their antient diet of herbs and roots, and beginning to uſe living creatures for food, they began alſo to change their ſacrifices. The ſcriptures, however, furniſh us with a different account; for Noah, it is ſaid, ſacrificed animals at his coming out of the ark; and even Abel himſelf ſacrificed the beſt and fatteſt of his flock; but Grotius thinks it more probable that he contented himſelf with making a mere oblation of his lambs, &c. without ſlaying them.

The Jews had two ſorts of ſacrifices, taking the word in its largeſt ſignification: The firſt were offerings of tythes, firſt-fruits, cakes, wine, oil, honey, and the like; and the laſt offerings of ſlaughtered animals. When an Iſraelite offered a loaf or a cake, the prieſt broke it in two parts, and ſetting aſide that half which he reſerved for himſelf, broke the other into crumbs, poured oil, wine, incenſe, and ſalt upon it, and ſpread the whole upon the fire of the altar. If theſe offerings were accompanied with the ſacrifice of an animal, they were thrown upon the victim to be conſumed along with it. If the offerings were of the ears of new corn, they were parched at the fire, rubbed in the hand, and then offered to the prieſt in a veſſel, over which he poured oil, incenſe, wine and ſalt, and then burnt it upon the altar, having firſt taken as much of it, as of right belonged to himſelf.

The principal ſacrifices among the Hebrews conſiſted of bullocks, ſheep and goats; but doves and turtles were accepted from thoſe who were not able to bring the other; theſe beaſts were to be perfect and without blemiſh. The rites of ſacrificing were various, all of which are very minutely deſcribed in the books of Moſes.

The manner of ſacrificing among the Greeks and Romans was as follows: in the choice of the victim, they took care that it was without blemiſh or imperfection; its tail was not to be too ſmall at the end; the tongue not black, nor the ears cleft; and that the bull was one that had never been yoaked. The victim being pitched upon, they gilt his forehead and horns, eſpecially if a bull, heifer, or cow. The head they alſo adorned with a garland of flowers, a woollen infula or holy fillet, whence hung two rows of chaplets with twiſted ribbands; and on the middle of the body a kind of ſtole, pretty large, hung down on each ſide; the leſſer victims were only adorned with garlands and bundles of flowers, together with white tufts or wreaths.

The victims thus prepared were brought before the altar; the leſſer being driven to the place, and the greater led by an halter; when if they made any ſtruggle or refuſed to go, the reſiſtance was taken for an ill omen, and the ſacrifice frequently was ſet aſide. The victim thus brought was carefully examined, to ſee that there was no defect in it: then the prieſt, clad in his ſacerdotal habit, and accompanied with the ſacrificers and other attendants, and being waſhed and purified according to the ceremonies preſcribed, turned to the right-hand and went round the altar, ſprinkling it with meal and holy-water, and alſo beſprinkling thoſe who were preſent. Then the cryer proclaimed with a loud voice, Who is here? To which the people replied, Many and good. The prieſt then having exhorted the people to join with him by ſaying, Let us pray, confeſſed his own unworthineſs, acknowledging that he had been guilty of divers ſins; for which he begged pardon of the gods, hoping that they would be pleaſed to grant his requeſts, accept the oblations offered them, and ſend them all health and happineſs; and to this general form added petitions for ſuch particular favours as were then deſired. Prayers being

ing ended, the prieſt took a cup of wine, and having taſted it himſelf, cauſed his aſſiſtants to do the like; and then poured forth the remainder between the horns of the victim. Then the prieſt or the cryer, or ſometimes the moſt honourable perſon in the company, killed the beaſt, by knocking it down, or cutting its throat. If the ſacrifice was in honour of the celeſtial gods, the throat was turned up towards heaven: but if they ſacrificed to the heroes or infernal gods, the victim was killed with its throat towards the ground. If by accident the beaſt eſcaped the ſtroke, leaped up after it, or expired with pain and difficulty, it was thought to be unacceptable to the gods. The beaſt being killed, the prieſt inſpected its intrails, and made predictions from them. They then poured wine, together with frankincenſe, into the fire, to increaſe the flame, and then laid the ſacrifice on the altar; which in the primitive times was burnt whole to the gods, and thence called an holocauſt: but in after times, only part of the victim was conſumed in the fire, and the remainder reſerved for the ſacrificers; the thighs and ſometimes the entrails being burnt to their honour, the company feaſted upon the reſt. While the ſacrifice was burning, the prieſt, and the perſon who gave the ſacrifice, jointly prayed, laying their hands upon the altar. Sometimes they played upon muſical inſtruments in the time of the ſacrifice, and on ſome occaſions they danced round the altar, ſinging ſacred hymns in honour of the gods.

SACRIFICE is alſo the name of an iſland in the gulph of Mexico, forty-five miles eaſt of La Vera Cruz: it is ſubject to the Spaniards.

SACRILEGE, the crime of profaning ſacred things, or thoſe devoted to the ſervice of God.

SACRISTAN, *ſacriſta*, a church officer, otherwiſe called ſexton. See SEXTON.

SACRISTY, *ſacriſtia*, in church hiſtory, an apartment in a church, where the ſacred utenſils were kept; being the ſame with our veſtry. See VESTRY.

SACRO-LUMBARIS, in anatomy, one of the extenſor muſcles of the back and loins, has its origin in the os ſacrum and the poſterior ſpine of the ilium, and its termination in the upper part of the ribs.

SACRUM OS, the ſacred bone, in anatomy, the lower extremity of the ſpina dorſi, being a bone of a triangular figure, with a rough ſurface; its ſubſtance is ſpongy, and it has two lateral apophyſes, for its articulation with the oſſa innominata; alſo two ſmaller upper apophyſes, with glenoid cavities for the articulation into the lower vertebra; and an inferior apophyſes, for its articulation with the os coccygis: it has alſo a canal, for the end of the ſpinal marrow.

The uſes of this bone are, 1. To ſerve as a baſis to the ſpine. 2. To form the pelvis along with the oſſa innominata, and to defend the parts contained in it. 3. To contain in its ſinus the lower part of the ſpinal marrow, called cauda equina. 4. To give paſſage at its foramina, which are ſometimes four ſometimes five pair, to the nerves of the inteſtinum rectum, the bladder, and of the parts of generation, and to the large crural and iſchiatic ones. 5. To ſerve as a place of origin to many of the muſcles.

In adults, the os ſacrum is one continued bone; but, in infants, it is almoſt entirely cartilaginous; and in children more grown up, it always conſiſts of ſeveral pieces, the junctures of four or five of which may be ſeen even in adults.

SADERASAPATAN, a port-town of the coaſt of Cormandel forty miles ſouth of Fort St. George. Here the Dutch have a factory.

SADDLE, is a ſeat upon a horſe's back, contrived for the conveniency of the rider.

A hunting-ſaddle is compoſed of two bows, two bands, fore-bolſters, pannels, and ſaddle-ſtraps; and the great ſaddle has, beſides theſe parts, corks, hind-bolſters, and a trouſſequin.

The pommel is common to both.

A horſeman that would ſit a horſe well, ought always to ſit on his twiſt, and never on his buttocks, which ought never to touch the ſaddle; and whatever diſorder the horſe commits, he ought never to move above the ſaddle.

The antient Romans are ſuppoſed not to have made uſe of ſaddles and ſtirrups, and it is thought that they did not come into uſe till the time of Conſtantine the Great, A. C. 340, as appears from the greek hiſtorian, Zonaras, who (through his whole hiſtory) makes no mention of a ſaddle for a horſe, before ſuch time as Conſtans attempting to deprive his brother Conſtantine of the empire, made head againſt his army, and entering into the ſquadron where he himſelf was, caſt him beſide the ſaddle of his horſe. The ſeveral ſorts

ſorts of ſaddles in uſe at preſent are. 1. The running-ſaddle; which is a ſmall one with round ſkirts. 2. The Burford-ſaddle; which hath the ſeat and the ſkirts both plain. 3. The pad-ſaddle; of which there are two ſorts, ſome made with burs before the ſeat, and others with bolſters under the thighs. 4. A french pad-ſaddle; of which the burs come wholly round the ſeat. 5. The portmanteau-ſaddle, that has a cantle behind the ſeat, to keep the portmanteau or other carriage off from the back of the rider. 6. A war-ſaddle; which has a cantle and a bolſter behind and before; alſo a fair bolſter. 7. The pack ſaddle. As for the ſeveral parts of a ſaddle, and the deſcription of them, they are to be found under their ſeveral heads. See the articles BOWS *of a ſaddle*, WHITHERS, STRAPS, BOLSTERS *of a ſaddle*, &c.

SADDLE-GALLED, in farriery. See the article GALLING.

SADDUCEES, in jewiſh antiquity, a famous ſect among the antient Jews, ſo called from their founder Sadoc Antigonus of Socho, preſident of the ſanhedrim at Jeruſalem, and teacher of the law in the principal divinity-ſchool of that city. Having often, in his lectures, aſſerted to his ſcholars, that they ought not to ſerve God in a ſervile manner, with reſpect to reward, but only out of filial love and fear; two of his ſcholars, Sadoc and Baithus, inferred from thence, that there were no rewards or puniſhments after this life: and, therefore, ſeparating from the ſchool of their maſter, they taught that there was no reſurrection, nor future ſtate. Many, embracing this opinion, gave riſe to the ſect of the ſadducees, who were a kind of epicureans, but differing from them in this, that though they denied a future ſtate, yet they allowed the world was created by the power of God, and governed by his providence; whereas the followers of Epicurus denied both.

The Sadducees denied all manner of predeſtination whatever, and not only rejected all unwritten traditions, but alſo all the books of the Old Teſtament, excepting the pentateuch. See the article PENTATEUCH.

SAFE-CONDUCT, a ſecurity given by the king under the great ſeal to a foreigner, for his ſafe coming into and paſſing out of the kingdom.

SAFE GUARD, a protection formerly granted to a ſtranger, who feared violence from ſome of the king's ſubjects, for ſeeking his right by courſe of law.

SAFFRON, *crocus*, in botany, *&c.* See the article CROCUS.

Saffron is cultivated in fields for uſe, and is no where raiſed with ſo much ſucceſs as in England, the engliſh ſaffron being generally allowed to be greatly ſuperior to any other. The uſual way of propagating it is by the bulbs, of which it annually produces new ones. Theſe are planted out in trenches at five inches diſtance, or leſs, and they ſeldom fail. They produce only leaves the firſt year, but in September, or October, of the year following, they flower. The ſaffron is gathered as ſoon as the flowers open, and is then ſeparated from all filth, and formed into cakes, by a very careful preſſure and gentle heat. At the end of October, when the flowering ſeaſon is over, the bulbs are taken out of the ground, and hung up in a dry place, and in ſpring are put into the ground again.

It is not, however, the entire flower of the plant that produces it, but only ſome of its internal parts. It is met with in the ſhops in flat and thin cakes, into which it has been formed by preſſing, and which conſiſt of many long and narrow filaments, that are ſmalleſt in their lower part, where they are of a pale yellow colour; in their upper part they are broader and indented at their edges, and of a very ſtrong and deep orange colour, approaching to redneſs. They are ſomewhat tough, moderately heavy, very eaſily cut, of an acrid, penetrating, but not unpleaſant ſmell, ſomewhat affecting the head, and of a bitteriſh and hot, but highly cordial taſte. Thrown into water, they almoſt inſtantaneouſly give it a ſtrong yellow or reddiſh colour, according to the quantity uſed. Theſe filaments are the criſtated capillaments, into which the piſtil of the flower divides at its head; they are of a deep reddiſh orange colour, while growing, and there are only three of them in each flower.

Saffron is to be choſen freſh, tough, flexile, difficult to be broken, of a ſtrong ſmell, and very bitter taſte, and ſuch as ſtains the hands.

Saffron is in many places in great eſteem in ſauces, and on many occaſions in foods; but its great uſe is in medicine, and indeed with us its ſole uſe. It is a high cordial, and a very powerful aperient, detergent, and reſolvent. It is of almoſt immediate relief againſt faintings and

and palpitations of the heart; it alfo ftrengthens the ftomach, and affifts digeftion. It is of great ufe in diforders of the breaft arifing from the lungs being loaded with a tough phlegm; and it foftens the irritating acrimony of a vitiated ferum on thofe parts, and by this means is often of great ufe againft inveterate coughs: wherefore, it is called *anima pulmonum*. It opens obftructions in the vifcera, and particularly in the liver; it cures jaundices, and promotes the menfes. It is alfo anodyne, and occafionally ferves as a paregoric; it is very happily joined with opium in the laudanum of Sydenham, and in many other preparations in which that medicine has a principal fhare.

Yet, notwithftanding all thefe virtues, faffron improperly adminiftered may do great harm: women with child, and thofe who have profluvia of the menfes, are never to meddle with it. It has an ebriating faculty, and when taken in immoderate dofes, may bring on dreadful head-achs, long fleep, convulfions, and even death. The very fmell of it affects the head greatly; its effluvia affect the eyes alfo, and give them great pain; and we have an account, in Borelli, of a druggift's fervant who died by the effect of a large parcel of faffron lying near his bed. Convulfive laughter is no uncommon effect of an immoderate dofe of faffron, and there are not wanting inftances of people who have died in that ftate: the very external ufe of faffron is alfo to be dreaded on fome occafions; the oxycroceum plaifter, of which it is an ingredient, muft by no means be applied in cafes where inflammation is feared; for it often occafions one.

The common dofe of faffron in fubftance, with us, is from five grains to ten, but we are told of much greater quantities given by many people.

Saffron, diftilled in a retort, firft yields a fmall quantity of a fine volatile acrid fpirit; after this a fubacid phlegm, then a fmall quantity of an effential oil, with a mixture of a volatile urinous falt; and by lixiviation of the refiduum, a pure alkaline falt may be obtained.

The preparations of faffron, in ufe in our fhops, are the tincture and the fyrup. The tincture may be extracted equally well, by means of water, and of fpirits of wine. Its dofe is from thirty drops to a drachm, or more; it is good in all cafes where the faffron in fubftance is fo. If wine be ufed inftead of fpirit, it is called vinum crocatum.

Syrup of faffron is thus prepared: take of fine faffron, an ounce; cut it fmall, and put it into a pint of mountain-wine to infufe; let it ftand three days without heat; then ftraining off the wine, filter it to render it perfectly clear, and add to it twenty-five ounces of doubly refined fugar; melt the fugar over a gentle fire, and fet it by for ufe.

SAFFRON, *crocus*, is alfo a name given to feveral chemical preparations, from their refembling the vegetable faffron in colour. See the article CROCUS.

*Meadow*-SAFFRON, *colchicum*, in botany, &c. See the article COLCHICUM.

SAFFRON WALDEN. See WALDEN.

SAGAN, a town of Silefia, fituated on the river Bober, fifty-fix miles north-weft of Breflaw.

SAGAPENUM, in pharmacy, &c. a gum-refin, brought to us in two forms; the finer and purer is in loofe granules, or fingle drops; the coarfer kind is in maffes compofed of thefe drops of various fizes, cemented together by a matter of the fame kind. In either cafe it is of a firm and compact fubftance, confiderably heavy, and of a reddifh colour on the outfide, brownifh within, and fpotted in many places with fmall yellowifh or whitifh fpecks. Its fmell is ftrong and difagreeable; its tafte acrid and unpleafant.

It is brought to us from Perfia and the Eaft-Indies. The plant which produces it has never been defcribed, but is fuppofed to be, as Diofcorides fays, of the ferula-kind, from the feeds and fragments of the ftalks fometimes met with in the body of it.

Sagapenum is a very great attenuant, aperient, and difcutient; it is good in all diforders of the breaft that owe their origin to a tough phlegm. It has alfo been found to difcufs tumours in the nervous parts, in a remarkable manner, and to give relief in habitual head-achs, where almoft all things elfe have failed. Its dofe is from ten grains to two fcruples, but it is now feldom given alone. It has been found, however, to do great things in afthmas, in obftructions of the vifcera, particularly the fpleen, in nervous complaints, and even in epilepfies. It alfo promotes the menfes, and expels the fecundines; and is an ingredient in the

 theriaca

theriaca, mithridate, and many other of the shop-compositions.

SAGATHEE, in commerce, a slight kind of woollen stuff, serge, or ratteen, sometimes mixed with a little silk.

SAGE, *salvia*, in botany, a genus of the diandria monogynia class of plants, with a monopetalous tubular flower, labiated at the mouth: there is properly no fruit, the seeds, which are four in number, and roundish, being contained in the bottom of the cup.

The common red sage has always been esteemed as a cephalic and sudorific. An infusion of it, made in the manner of tea, has been long famous, as the common drink of people in fevers. It is attenuant and diuretic; it promotes the menses, and is good in vertigoes, tremors, palsies, and in catarrhs. The virtues and uses of the sage of virtue, are the same with the other. Its name, indeed, has made many prefer it to the common sage for the making tea for people in fevers; but the more agreeable flavour of the common kind, and the pleasant colour of the infusion, when a little lemon juice is added, have again of late restored it into general use.

SAGENE, a russian long measure, five hundred of which make a werst: the sagene is equal to seven english feet.

SAGINA, in botany, a genus of the tetrandria-tetragynia class of plants, the flower of which consists of four oval, obtuse, and patent petals, shorter than the cup: the fruit is an oval quadrilocular capsule, consisting of four valves, and containing numerous very small seeds, affixed to the receptacle.

SAGITTA, in astronomy, the arrow, or dart, a constellation of the northern hemisphere, near the eagle; consisting of five stars, according to Ptolemy and Tycho; but in Mr. Flamsteed's catalogue, of no less than twenty-three.

SAGITTA, in botany, implies the top of any small twig, cyon, or graft of a tree.

SAGITTA, in trigonometry, the same with the versed sine of an arch.

SAGITTAL *suture*, in anatomy, the second of the genuine sutures of the cranium or skull. See the article SKULL.

SAGITTARIA, or SAGITTA, WATER ARROW-HEAD, in botany, a genus of the monoecia-polyandria class of plants, the male corolla whereof consists of three roundish, obtuse, plane, patent petals, thrice longer than the cup; the female corolla is like that of the male one: there is no pericarpium; the receptacle, which is globose, collects the seeds into a globe; the seeds are numerous, compressed, and surrounded longitudinally with a broad membranaceous margin.

SAGITTARIUS, the ARCHER, in astronomy, the ninth sign of the zodiac. See the article ZODIAC.

The stars in this constellation in Ptolemy's catalogue are thirty-two, in Tycho's sixteen, and in Mr. Flamsteed's fifty-two.

SAGO, a simple brought from the East-Indies, of considerable use in diet as a restorative.

Sago is a sort of bread produced in the following manner, from a tree called landan, growing in the Moluccos. When a tree is felled, they cleave it in two in the middle, and dig out the pith, which is eatable, when it comes fresh out of the tree. They pound it in a mortar, till it is reduced into a kind of powder somewhat like meal. Then they put in a searce made of the bark of the same tree, placing it over a cistern made of its leaves, and pour water on it, which separates the pure part of the powder from the woody fibres wherewith the pith abounds. The flour thus filtrated they call sagu, which they make into paste, and bake it in earthen furnaces.

SAGREE, in ichthyology, a species of the squalus with no pinna ani, and with the nostrils at the extremity of the rostrum. See the article SQUALUS.

This species grows to about five feet in length, the head is large and depressed, the rostrum is subacute, and the nostrils are situated at its extremity, each having two apertures.

SAICK, or SAIQUE, a turkish vessel, very common in the Levant for carrying of merchandize.

SAIL, in navigation, an assemblage of several breadths of canvas, sewed together by the lists, and edged round with a cord, fastened to the yards of a ship, to make it drive before the wind. See the article SHIP.

Every yard in a ship has its proper sail, except the cross-jack, which takes its name from the yard: and those which are not bent to the yard, are the flying jibb, fore, foretop, main, maintop, maintop-gallant, mizen, mizentop-mast, stay-sails, main and maintop studding-sails. See the article SHIP.

Fig. 1. Great Circle-SAILING.

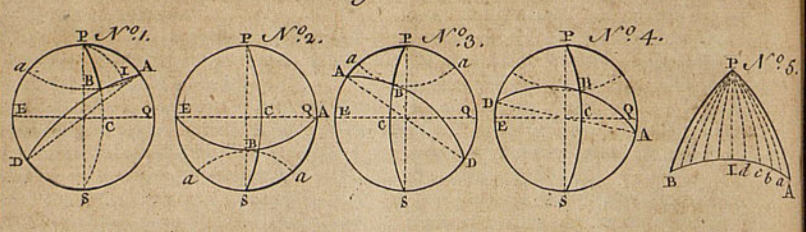



Fig. 2. SALIANT.



Fig. 3. SALTIER.



Fig. 4. SANICLE.



Fig. 5. SATURN.

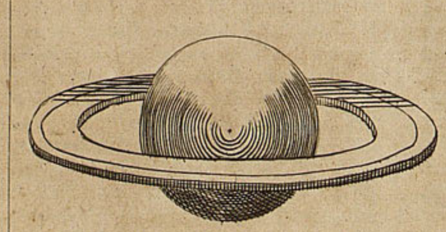


Fig. 6. SAXIFRAGE.



Fig. 7. The SAW used in Amputations.

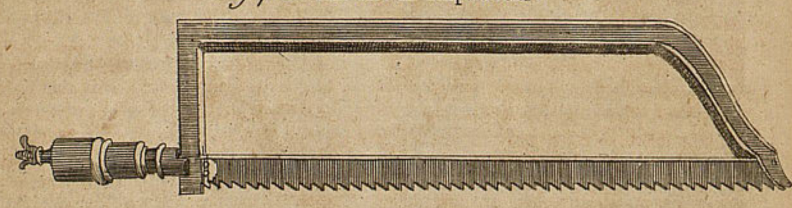


Fig. 8. The SAW-FISH.



T. Jefferys sculp.

SAILS also denote the vanes of wind-mills. See the article WIND-MILL.

SAILS, in falconry, a term for the wings of a hawk. See the article HAWK.

SAILING, properly denotes the art of navigating and working a ship, or of causing her to observe such motions and directions as are assigned by the navigator; in which sense, sailing differs from navigation, and must be learned by practice on shipboard. See NAVIGATION.

The most advantageous position of the sails and rudder of a ship, has been already treated of under the article MAXIMUM.

And that their action may be reduced to the principles of the lever, has been shewn under the article LEVER.

The resistance too which the ship meets with from the water, has been considered under the article RESISTANCE.

SAILING also denotes a particular method of navigation; in which sense we say, Mercator's sailing, plane sailing, parallel sailing, middle latitude sailing, and great circle sailing: all which, except the last, have been already explained under the article NAVIGATION.

*Great circle*-SAILING, in navigation, the art of finding what places a ship must go through, and what courses to steer; so that her tract shall be in the arch of a great circle, or nearly so, passing through the place sailed from and that bound to.

It is chiefly on account of the shortest distance, that this method of sailing has been proposed; for in the sphere, it is well known that the shortest distance between two places is the arch of a great circle intercepted between them, and not in the rhumb or spiral passing through those places. See the article RHUMB.

As, in Mercator's sailing, the several cases were solved by plane triangles; so the solution of the cases of great circle-sailing is obtained by means of spherical triangles: and, therefore, the navigator should be master of spherical trigonometry, before he attempts this method. See the article TRIGONOMETRY.

A great variety of cases might be proposed in this kind of sailing; but as many of them may serve rather for exercises in the solution of spherical triangles, than for any real use towards the navigating of a ship, we shall only consider those appertaining to the following problems, *viz.*

Prob. I. The latitudes and longitudes of two places on the earth being given, required their nearest distance on the surface, together with the angles of position from either place to the other. This problem may be branched out into the six following cases.

Case I. When the two places lie under the same meridian, their difference of latitude will give their distance, and the position of one from the other will be directly north or south.

Case II. When the two places lie under the equator, their distance is equal to their difference of longitude; and the angle of position, with respect to the meridian of either, is a right angle, or the course from one to the other is due east west.

Case III. When both places are in the same parallel of latitude.

Example. What is the shortest distance between St. Mary's, in N. lat. 37°, and W. long. 22° 56′; and Cape Henry, in N. lat. 37°, and W. long. 76° 23′?

Let P E S Q (plate CCXXXVI. fig. 1. n° 1.) represent the meridian of St. Mary's, A B *a* the parallel of 37° N. lat. and P B C S the meridian of Cape Henry; then will the point A be St. Mary's, and the point B Cape Henry: draw the diameter A D, and through the points A, B, D, describe the great circle A B D; then is the arch A B the shortest distance, the angle P A B the angle of position from A to B; and the angle P B A the angle of position from B to A; and the angle A P B, which is measured by the arch Q C, is the difference of longitude. Now as the places have both the same latitude, therefore P A = P B, and ∟ P A B = ∟ PBA; and if P I be described making ∟ A P I = ∟ B P I = 26° 43′ ½, then will P I bissect A B, and be perpendicular to it in I. And in the triangle A I P, right-angled at I, there will be given the hypothenuse A P = 53°, and the angle A P I = 26° 43′ ½; whence to find the leg A I =, half the distance sought, we have this analogy, *viz.* radius = 90° : sine of hypothenuse P A = 53° :: sine of ∟ A P I = 26° 43′ ½ : sine of the leg A I = 21° 3′ ½; which doubled gives 42° 6′ for the shortest distance A B = 2526 nautical miles, which is 35 miles less than 2561, the nautical miles found by parallel sailing.

To find the angle of position P A B, we have this analogy, *viz.* Radius = 90° : co-sine of hypothenuse, P A = 53° :: tangent of ∟ A P I = 26° 43′ ½ : co-tangent of ∟ P A B, or angle of position = 73° 9′. Hence

Hence it appears, that to ſail from A to B, or from B to A, the ſhip muſt firſt ſteer, N. 73° 9′ weſt or eaſt; and then gradually increaſe her courſe till I, where it will be due weſt or eaſt; and from thence the courſe is to be gradually diminiſhed again till ſhe comes to the other port, where it will be 73° 9′, the ſame as ſhe ſets out with: but how theſe courſes are to be altered will be ſhewn hereafter.

Caſe IV. When one place has latitude, and the other has none, or is under the equator.

Example. What is the neareſt diſtance between the iſland of St. Thomas, under the equator, and eaſt long. 1°, and port St. Julian in ſouth lat. 48° 51′, and weſt long. 65° 10′?

Let the point A (*ibid.* n° 2.) repreſent St. Thomas, and the point B port St. Julian; then is A B, an arch of a great circle paſſing through A and B, the neareſt diſtance; which may be found by this analogy, *viz.* Radius = 90°: co-ſine of difference of long. = A C = 66° 10:: co-ſine of difference of latitude C B = 48° 51′: co-ſine of the diſtance A B = 74° 35′. So that the diſtance A B = 74° 35′ = 4475 miles; which is leſs, by fifty-ſeven miles, than the diſtance found by Mercator's ſailing.

For finding the angle of poſition at A, the proportion is R = 90°: ſine A C = 66° 10′:: co-tangent C B = 48° 51′: co-tangent of ∟ S A B = 51° 22′. And the angle of poſition at B may be found by this analogy, *viz.* R = 90°: ſine C B = 48° 51′:: co-tangent A C = 66° 10′: co-tangent ∟ B = 71° 36′.

Caſe V. When the latitude of the given places are either both north or both ſouth.

Example. What is the neareſt diſtance between the Lizard in north lat. 49° 57′, and weſt long. 5° 14′. and the iſland of Bermudas, in north lat. 32° 25′, and weſt longitude 66° 38′?

Let S A P Q (*ibid.* n° 3.) repreſent the meridian of Bermudas; make P A = 57° 35′ = the co-latitude of Bermudas; and P *a* = 40° 3′ = co-latitude of the Lizard; and, with the tangent of P *a*, deſcribe the arch *aa*: alſo, with the ſecant of 61° 24′ = difference of long. arcs deſcribed from P and S, give the center of the circle, P C S, the meridian of the Lizard; and its interſection with *a a* gives B the place of the Lizard. Laſtly, a great circle being deſcribed through the points A B D, the intercepted arch A B is the neareſt diſtance between the two places; and the angles P A B, P B A, are the angles of poſition. In the oblique ſpheric triangle A P B, are given P A = 57° 35′, P B = P A = 40° 3′, and ∟ A P B = difference of long. = 61° 24′. Hence, to find the diſtance AB, we have this analogy, *viz.* rad.: co-ſine ∟ A P B:: tang. A P: tang. of a fourth arc = 37° 1′ = M; which taken from the co latitude of the Lizard, leaves a fifth arc = 3° 2′ = N. Then, co-ſine M: co ſine N:: co-ſine P A: co-ſine of the diſtance A B = 47° 54′.

To find the angle of poſition P B A, the proportion is, ſine of N: ſine of M:: tangent ∟ A P B: tangent ∟ P B A = 87° 15′. And the angle of poſition, P A B, may be found by the proportion between oppoſite ſides and angles, *viz.* ſine of P A: ſine of ∟ P B A:: ſine of P B: ſine of ∟ P A B = 49° 35′.

Hence it appears that the ſhorteſt diſtance between the Lizard and Bermudas, is 47° 54′ = 2874 nautical miles; which is 178 miles leſs than the diſtance found by Mercator's ſailing. And a ſhip, in order to run this ſhorteſt tract, muſt ſail from the Lizard S. 87° 15′ W. and gradually leſſen the courſe, ſo as to arrive at Bermudas on the rhumb bearing S. 49° 35′ W. whereas the direct courſe from one place to the other, as found by Mercator's ſailing, is S. 69° 2′ W.

Caſe VI. When one of the given places has north latitude, and the other ſouth latitude.

Example. What is the neareſt diſtance from the iſland of St. Helena to the iſland of Bermudas; the former lying in S. lat. 16°, and W. long. 6° 15′; and the latter in N. lat. 32° 25′, and W. long. 66° 38′?

Let S E P Q A (*ibid.* n° 4.) be the meridian of St. Helena, the point A St. Helena, and the point B Bermudas; then we have given P A = 106° = lat. of St. Helena + 90°, PB = co-latitude of Bermudas = 57° 35′, and ∟ A P B = difference of longitude = 60° 23′. Therefore, in the oblique ſpheric triangle A B P, we have the following proportions for finding the diſtance A B, *viz.* rad.: co ſine difference of long. = ∟ A P B:: tangent co-latitude of Bermudas = P B: tangent of a fourth arc M = 37° 54′; which taken from 106° leaves a fifth arc N = 68° 6′. And co-ſine of M: co-ſine of N:: co-ſine of PB: co-ſine of the diſtance AB = 75° 19′.

Next to find the angle of poſition P A B, the

the fourth and fifth arcs being found before, we have this proportion, *viz.* fine of N : fine of M : : tangent A P B : tangent of P A B = 49° 20′. And to find the angle of pofition P B A, the proportion is as rad. : co-fine ∟P : : tangent P A : tangent of a fourth arc M = 59° 53′: But this fourth arc muft be like P A, or obtufe; and therefore the fupplement of 59° 53′, or 120° 7′, is the fourth arch M. Then, as fine of N : fine of M : : tangent ∟ P : tangent of ∟P B A = 59° 45′: but this angle ought to be obtufe, and therefore we muft take the fupplement to it, *viz.* 120° 15′.

So that was a fhip to fail from St. Helena to Bermudas, on the arc of a great circle, fhe muft firft fhape her courfe N. 49° 20′ W. and gradually deflect from the north, fo as to arrive at Bermudas on a courfe N. 59° 45′ W. after having run 75° 19′, or 4519 nautical miles. The courfe found by Mercator's failing is N. 50° 5′ W. and the diftance is 4527 fea-miles; whereby it appears, that when the places are one in N. latitude, and the other in S. latitude, there is but a fmall difference between the refults found by Mercator's and great circle failing, becaufe the rhumb lines near the equator do not greatly differ from great circles.

From the folutions of the foregoing cafes it is plain, that to fail in a great circle the fhip muft continually alter her courfe: but as this is a difficulty too great to be admitted into the practice of navigation, therefore it has been thought fufficiently exact to effect this bufinefs by a kind of approximation; that is, by a method which nearly approaches the failing on a great circle: for in fmall arcs the difference between the arc and its chord, or tangent, is fo fmall that they may be taken one for the other in any nautical operations. Upon this principle the great circles on the earth are fuppofed to be made up of fhort lines, each of which is a fegment of a rhumb-line; and on this fuppofition the folution of the following problem is deduced.

Prob. II. Having given the latitudes and longitudes of the places failed from and bound to; to find the fucceffive latitudes in the arc of a great circle, in thofe places, where alterations in longitude fhall be a given quantity; together with the courfes and diftances between thofe places.

Solution. 1. Find the angle of pofition at each place, and their neareft diftance, by one of the cafes of prob. I. 2. Find the greateft latitude the great circle runs through; that is, find the perpendicular from the pole to that circle; and alfo find the feveral angles at the pole, made by the given alterations of longitude between this perpendicular and the fucceffive meridians come to. 3. With this perpendicular and the polar angles, feverally, find as many correfponding latitudes, by faying, as radius : tangent of greateft latitude

: : co-fine of 1ft. polar ∟ : tang. 1ft. lat.
: : co-fine of 2d. polar ∟ : tang. 2d. lat.
&c. &c.

4. Having thus found the feveral latitudes paffed through, and the difference of longitude between each, find by Mercator's failing the courfes and diftances between thofe latitudes: and thefe are the feveral courfes and diftances the fhip muft run to keep nearly on the arc of a great circle.

Now the fmaller the alterations in longitude are taken, the nearer will this method approach the truth: but the ufual way is to compute to every five degrees of difference of longitude, the length of the arc of five degrees, differing from its chord, or tangent, only by 0,0002.

If the refults of the feveral operations, for inftance of the example of cafe III. prob. I. wrought by this method, be entered in fuch a table as the following, it will be found of convenience to the operator.

| Polar angles (*ibid.* n° 5) | Succefs longs. | Succefs lats. | Diff. long. | Diff. lat. | Merid. parts. | Merid. diff. lat. | Courfes. | Diftances. |
|---|---|---|---|---|---|---|---|---|
| ∟IPB = 26° 43′½ | 22° 56′ | 37° 00′ | | | 2392.0 | | | |
| ∟IP*a* = 21° 43′½ | 27° 56′ | 38° 05′ | 300 | 65 | 2474.6 | 82.0 | 74° 43′ | 246.6 |
| ∟IP*b* = 16° 43′½ | 32° 56′ | 38° 56′ | 300 | 51 | 2539.8 | 65.2 | 77° 44′ | 240.0 |
| ∟IP*c* = 11° 43′½ | 37° 56′ | 39° 33′ | 300 | 37 | 2587.6 | 47.8 | 80° 57′ | 235.2 |
| ∟IP*d* = 6° 43′½ | 42° 56′ | 39° 57′ | 300 | 24 | 2618.8 | 31.2 | 84° 04′ | 232.2 |
| | 49° 39′½ | 40° 09′ | 403.5 | 12 | 2674.5 | 15.7 | 87° 46′ | 207.0 |
| | | | | | | | | 1261.9 |

Hence

Hence it appears that the ſhip muſt firſt ſail N. 74° 43′ W. the diſtance of 246.6 nautical miles; againſt which time ſhe will have changed her latitude and longitude, &c. as expreſſed in the reſpective columns ſtanding in a line with the above courſe and diſtance. Her ſecond courſe will be N. 77° 44′ W. the diſtance 240 nautical miles; and the other particulars as expreſſed in the ſame line under their ſeveral columns. Now the column of diſtances, being ſummed up, amounts to 1261.9; which being doubled, gives 2523.8 nautical miles for the diſtance between St. Mary's and Cape Henry; differing only from 2526, the diſtance found by prob. I. caſe III. by 2. 2. miles.

The tract of a ſhip, when thus directed nearly in the arc of a great circle, may be delineated on the Mercator's chart, by marking thereon, by the help of latitudes and longitudes, the ſucceſſive places where the ſhip is to alter her courſe: then thoſe places, or points, being joined by right lines, will ſhew the path along which the ſhip is to ſail, under the propoſed circumſtances.

SAILORS, the elder ſeamen, who are employed in working or managing the ſails, the tackle, ſteering, &c. See the articles NAVAL *affairs*, SEAMEN, &c.

SAINT, in the romiſh church, a holy perſon deceaſed, and ſince his deceaſe canonized by the pope, after ſeveral informations and ceremonies. See CANONIZATION, BEATIFICATION, &c.

One of the points wherein the roman catholics and proteſtants differ is, that the former addreſs, invoke, and ſupplicate ſaints, &c. to intercede for them; whereas the latter hold it ſufficient to propoſe their good examples for our imitation.

The number of ſaints, allowed as ſuch in the romiſh church, is prodigious. Father Papebroche reckons ſeventeen or eighteen to have died on the firſt of June only. Father Mabillon, in an expreſs diſſertation on the worſhip of unknown ſaints, obſerves, that honours are given to ſaints who perhaps were not chriſtians, and whoſe very names were never known: hence, being under a neceſſity of giving them names, they are therefore called baptized ſaints. He adds, that they every day beſeech ſaints to intercede for them with God, when it is a matter of doubt whether they themſelves be in heaven.

SAINT-FOIN, in botany, a ſpecies of the hedyſarum. See the article HEDYSARUM.

For the uſe of this plant in feeding cattle, ſee HAY and GRASS.

SAINTES, a city of France, in the province of Guienne, capital of the territory of Saintogne, ſituated on the river Charente, in weſt long. 36′, north lat. 45° 50′.

SAKER, a ſmall ſort of cannon, whereof there are three ſpecies, extraordinary, ordinary, and middle ſized. See the article CANNON.

SAL, in chemiſtry, &c. See SALT.

For the preparations and uſes of ſal-armoniacum, ſal anatron, ſal Glauberi, ſal-prunellæ, ſal-tartari, ſal-polycreſtum, ſal-gemmæ, ſal-volatile, &c. See the article ARMONIAC, ANATRON, GLAUBER'S SALT, *Sal*-PRUNELLÆ, &c.

SAL CIRCULATUM, in chemiſtry, a term uſed by Paracelſus for a preparation of ſea-ſalt, of which he diſtinguiſhes two kinds, under the name of the circulatum minus, and the circulatum majus. Theſe ſeem to have a great affinity with the famous alkaheſt, or univerſal ſolvent, ſo much talked of in the works of this author and his ſucceſſor Van Helmont. See the article ALKAHEST.

SAL, one of the iſlands of cape Verd, ſituated in the Atlantic-ocean: weſt long. 23°, lat. 17°.

SALA, a river of Germany, which riſing in Franconia and running north, enters Saxony and falls into the Elbe below Deſſau.

SALA, a town of Sweden, in the province of Weſtmania, ſituated thirty miles weſt of Upſal.

SALACIA, in zoology, a genus of the gymnarthria, or thoſe inſects which have ſoft and naked bodies furniſhed with limbs.

The body of the ſalacia is of an ovato oblong form, and the tentacula are numerous and diſpoſed in little cluſters.

There are two ſpecies of the ſalacia, the one with an undulated ſurface, about an inch and three quarters in length, and its thickneſs about an inch: it is largeſt at the naked extremity, where it terminates in a rounded but not very thick end. The other is the ſmooth and oblong ſalacia, of about two inches and a half long, and an inch and a half in diameter.

SALAMANCA, a city of Spain in the province of Leon, ſituated on the river Tormes: weſt long. 6° 10′, north latitude 41°.

SALAMANCA is alfo a city of Mexico, in North-America, in the province of Jucatan, fituated near the gulph of Honduras: weft long. 93°, north lat. 17° 15′.

SALAMANDER, *falamandra*, in zoology, a name given by authors to feveral fpecies of the lizard kind; but the principal are two, the falamandra aquatica, the water-newt, and the falamandra terreftris. See LACERTA and NEWT.

The falamandra aquatica is the two-edged-tailed lizard, with four toes on the anterior, and five on the hinder, feet. It grows to about four inches in length, and to the thicknefs of a man's finger: the back is of a deep fhining brown; the belly of a bright and gloffy yellow.

The falamandra terreftris, or land falamander, is a fpecies of lizard, the tail of which is fhort, and its colour of a fine black, marked with red fpots of a bright and fhining gloffy appearance.

SALAMANDER'S BLOOD, among chemifts, denotes the rednefs remaining in the receiver after diftilling the fpirit of nitre. See the article NITRE.

SALAMIS, an ifland in the gulph of Engia, in european Turky, fituated in eaft long. 34°, north lat. 37° 32′, being about fifty miles in circumference.

SALANKAMEN, a town of Sclavonia, fituated on the Danube, twenty miles north-weft of Belgrade.

SALARY, *falarium*, a recompence made to a perfon for his pains or induftry about another perfon's bufinefs, as in the cafe of officers, &c. And it is generally taken for any wages, ftipend, or allowance.

SALE, in general, fignifies the transferring the property of goods from one to another, upon fome valuable confideration, as where in a bargain one agrees to give another a certain fum of money for fuch goods, and thereupon gives the feller earneft, which he accepts; this is a perfect fale, and fhall bind the buyer and feller.

A perfon may at any time fell his goods or chattels, even though he fears and knows of an execution againft him for debt, unlefs there be a private truft between the parties, and the writ of execution is delivered to the fheriff, &c. And it is held that upon the fale of a horfe, or other beaft, it may not only be detained till the fame is paid for, but if fuch horfe, &c. happens to die, after being fold, and before delivery, the feller may have an action for the money agreed, the property being in the buyer. See BARGAIN, EARNEST, &c.

Where a perfon affirms a particular thing fold to be of a certain value, and at the fame time it is not, for this no action lies; but if he actually warrants the fame, and this be not the cafe after fale, it will bear an action, as being part of the agreement. As to the fale of goods in fairs and markets, fee the articles FAIR and MARKET.

SALEM, a port town of New-England, a little north of Bofton.

SALEP, in the materia medica, the root of a fpecies of orchis. See ORCHIS.

Salep fhould be chofen clean, firm and hard: it is very little liable either to decay or fophiftication. The people of the Eaft-Indies look upon falep to be one of the greateft reftoratives and provocatives to venery in the whole vegetable world. The falep differs very little from the common orchis in virtue. Its appearance is owing to the manner of preparing it, and confequently this may be done from the roots of orchis of our own growth. To prepare thefe in imitation of falep, Mr. Geoffroy chofe the largeft, faireft, and plumpeft roots he could find: thefe he nicely fkinned; then throwing them into cold water he fuffered them to macerate there for fome time: after this he lightly boiled them, and then taking them out of the water and draining them, he had them ftrung upon threads to be dried in a warm dry air: when the roots were thoroughly dried they were very tranfparent, and refembled pieces of tragacanth, and continued dry and hard. The roots thus prepared may be reduced to powder, which will diffolve away in boiling water, and a fcruple of it will make a bafon full of jelly, in the manner of the turkifh falep. This jelly is an admirable medicine in all cafes in which falep is prefcribed; and the powder may be given with great fuccefs in affes-milk for difeafes of the breaft. The falep which we receive from Turky is always a tranfparent root, of a whitifh or reddifh colour, according to its different age, and is chiefly recommended in confumptions, bilious dyfenteries and diforders of the breaft proceeding from an acrimony of the juices.

SALERNO, a city and port-town of Italy, in the kingdom of Naples, and the hither

hither principat, situated on a bay of the tuscan-Sea: east long. 15° 20′, north lat. 40° 40′.

SALET, Sallet, or Salade, in war, a light covering or armour for the head, antiently worn by the light horse, only differing from the cask in that it had no crest, and was little more than a bare cap.

SALIANT, in fortification, denotes projecting. There are two kinds of angles, the one saliant, which are those that present their point outwards; the other re-entering, which have their points inwards. Instances of both kinds we have in tenailles and star-works. See the article Angle, &c.

Saliant, Salient, or Saillant, in heraldry, is applied to a lion, or other beast, when its fore-legs are raised in a leaping posture. See plate CCXXXVI. fig. 2.

A lion salient is that which is erected bend-ways, standing so as that his right fore-foot is the dexter chief point, and his hinder left foot is the sinister base point of the escutcheon, by which it is distinguished from rampant. See the article Rampant.

SALIC, or Salique law, *lex salica*, an antient and fundamental law of the kingdom of France, usually supposed to have been made by Pharamond, or at least by Clovis, in virtue whereof males are only to inherit. Du Haillan, after a critical examination, declares it to have been an expedient of Philip the long, in 1316, for the exclusion of the daughter of Lewis Hutin from inheriting the crown. Father Daniel, on the other hand, maintains that it is quoted by authors more antient than Philip the long, and that Clovis is the real author of it. This law has not any particular regard to the crown of France; it only imports, in general, that in salic land no part of the inheritance shall fall to any female, but the whole to the male sex. By salic lands, or inheritances, were antiently denoted, among us, all lands, by whatever tenure held, whether noble or base, from the succession whereto women were excluded by the salic law; for they were by it admitted to inherit nothing but moveables and purchases wherever there were any males.

SALICORNIA, in botany, a genus of the monandria-monogynia class of plants, having no corolla; there is no pericarpium, but the calyx becomes more ventricose and contains a single seed.

A decoction of the leaves of this plant is very opening, provokes urine and the menses, accelerates the birth and secundines, purges watry humours, whence it is of service in a dropsy. Its ashes are used in making soap and glass: and being infused in water, cure the itch and all cutaneous diseases, the part affected being washed therewith.

SALII, in roman antiquity, priests of Mars, whereof there were twelve, instituted by Numa, wearing painted particoloured garments and high bonnets, with a steel-cuirasse on the breast. They were called salii from *saltare*, to dance; because, after assisting at sacrifices, they went dancing about the streets, with bucklers in the left hand, and a rod in the right, striking musically on one another's bucklers with their rods, and singing hymns in honour of the gods. In singing they had a peculiar antient song, called Saliare carmen; and after the ceremony they were entertained with a feast. There were two companies or colleges of the salii; the antient one established by Numa, called palatini; the latter by Tullus Hostilius, called collini and quirinales. Sextus Pompeius makes mention of salian maids, *virgines saliares*, hired on purpose, and joined with the salii, wearing a kind of military garb, with high round bonnets, like the salii.

SALINA, antiently Salamis, a port-town of the island of Cyprus, situated on the south side of the island, in east long. 34° 30′, and north lat. 34° 30′.

SALINE, a name given to a preparation of sea-salt, procured from the froth of the sea, hardened by the sun in hot countries. It is called by some authors pilatro de Levante, and is used in glass-making; and in the making the fine purple-colour from cochineal, by boiling it in a small quantity, with the bran and fœnugreek, of which the magistery is made for that purpose.

Saline is also the name given by authors to springs of salt-water, called by us salt-wells, salt-springs, and brine-pits.

Saline *principle*, a term used by the chemical writers, to express a constituent part of several mixt bodies, on which their existence in that form depends; and which, though always existent in them, and always separable by art, is yet not perceivable in many of them in the complex.

Saline

SALINE *earths.* The chemifts under this, as a general head, reckon all thofe faline and earthy fubftances, which are calcined or burnt in the fire: as all the kinds of lime, pot-afhes, foot, and the like; thefe being fo many mixtures of falt and earth; and all falts appearing to them, indeed, on a rigorous examination, to be only earths of different natures, which when reduced to a certain degree of fubtility or finenefs of parts, fo as permanently to diffolve in water, are then emphatically denominated falts.

SALINS, a city of France, in the province of Franche Comte, fituated in eaft long. 5° 50′, and north lat. 47°.

SALISBURY, the capital city of Wiltfhire, fituated eighty miles weft of London, and thirty-five miles fouth-eaft of Briftol. It fends two member to parliament.

SALIVA, SPITTLE, a thin pellucid humour, feparated from the arterial blood, by the glands about the mouth and fauces, and conveyed, by proper falival ducts, into the mouth, for feveral ufes.

It confifts of a great deal of water or phlegm, and a volatile falt, and fome add a fulphureous fpirit; and is void both of tafte and fmell. Its ufes are very great; it moiftens the throat, preferves it from the injuries of the air, and facilitates fpeech. Being mixed with aliment, it renders fwallowing eafy, and affifts digeftion by its aqueous, faline, and oily parts. Some imagine it to do the office of a menftruum, by mixing the oily and aqueous parts of the food more intimately, diffoving the faline parts, and procuring a fermentation in the ftomach: but Dr. Drake is of opinion, that were the faliva acrimonious enough for this purpofe, it muft greatly offend the ftomach, efpecially confidering the quantities of it that many fwallow, even upon an empty ftomach. In hungry perfons, fays Boerhaave, it is fluid, acrid, and copioufly difcharged; and in thofe who have fafted long, it is highly acrid, penetrating, and refolvent. In farinaceous and fucculent vegetables, it not only produces a fermentation, but alfo augments one already begun. It is fwallowed not only by brutes, but by human creatures, in a found ftate, even when afleep. Too copious an evacuation of it, made voluntarily, produces lofs of appetite, bad digeftion, and an atrophy. By manducation therefore the faliva is expreffed and accurately mixed with the attenuated food; which contributes, firft, to the affimilation of the aliments to the nature of the body to be nourifhed: fecondly, to the due mixture of the oleous to the aqueous parts: thirdly, to the folution of the faline parts: fourthly, to fermentation: fifthly, to a change of the tafte and fmell of the aliments: fixthly, to an augmentation of the inteftine motion: feventhly, to a momentaneous relief from hunger; and, eighthly, an application of the fapid parts, though infipid itfelf. See CHYLIFICATION, DIGESTION, *&c.*

SALIVAL, an epithet applied to the glands and ducts which fupply and fecrete the faliva. See the articles GLAND, DUCT, and the preceding article.

Anatomifts commonly reckon three pair of falival glands, *viz.* two parotides, two maxillares, and two fublinguales. See the articles PAROTIDES, *&c.*

Thefe indeed are the largeft, and furnifh the greateft quantities of faliva; but there are a great number of other leffer glands of the fame kind, which may be reckoned affiftants, or fubftitutes to the former; all thefe may be determined falival glands, and they may be enumerated in the following manner: the parotid glands, the maxillary glands, the fublingual glands, the glandulæ molares, buccales, labiales, the linguales, the amygdalæ, the palatinæ, the uvulares, the arytenoidææ, and the glandula thyroidæa.

With regard to the falival ducts, the moft noted of them is that of the parotides, produced by the union of a great number of fmall tubes, reprefenting fo many roots; it is called the ductus ftenonis, or ductus fuperior; it runs obliquely forwards, on the outfide of the maffeter, and then perforates the buccinator from without inward, oppofite the interftice between the fecond and third dentes molares, where the hole or orifice reprefents the fpout of an ewer. The duct of the maxillary gland, called alfo the lower or inferior duct, and the ductus falivalis Whartoni, advances on the fide of the mufculus genioglossus along the inner part and fuperior edge of the glandula fublingualis to the frenum of tongue, where it terminates by a fmall orifice, in form of a papilla. The glandulæ fublinguales fend out laterally feveral ducts, which open near the gums, by the fame number of orifices, all ranked in the fame line, but a fmall diftance from the frenum, and a little more backward.

*Extirpation of the* SALIVAL *glands*, a method which Heifter tells us he often has had recourfe to, when thefe glands have been violently fwelled and feverely indurated, even approaching to a carcinomatous nature, after they had been treated by other phyficians with corrofives, digeftives and other medicines. In this operation the furgeon muft open the fkin above the tumour, with a longitudinal incifion, and carefully feparate the fchirrhous glands from the contagious part with a knife, and at laft from the arteries with which it is connected; then immediately, whilft the blood rufhes out in great abundance, the operator muft dip a ball of linen rags in a ftyptic liquor, and prefs it upon the larger wounded arteries; the remainder of the cavity of the wound muft be filled with fcraped lint and dry rags, and compreffed with the finger, and then a larger piece of puff-ball, with three or four thick compreffes muft be applied, fecuring the whole with a proper bandage. After the third or fourth day, the bandage and comprefs may be removed, and fo much of the puff-ball as is loofe, leaving every thing that has a ftrong adhefion; then new compreffes, dipped in warm fpirit of wine, or digeftive fomentations may be directly applied, and fecured with the bandage, as before, but a little more relaxed: the fecond and third dreffings muft be performed every other day, and the reft muft be renewed every day. In all the dreffings it muft be obferved, that none of the compreffes, puff-ball, or lint be removed, but what are quite loofe: the wound may be cleanfed by fome digeftive ointment, and incarnated by a vulnerary balfam. See the article WOUND.

SALIVATION, in medicine, a promoting of the flux of faliva, by means of medicines, moftly by mercury. The chief ufe of falivation is in difeafes belonging to the glands, and the membrana adipofa, and principally in the cure of the venereal difeafe, though it is fometimes alfo ufed in epidemic difeafes, cutaneous difeafes, *&c.* whofe crifes tend that way. See the article POX, *&c.*

A falivation is excited, according to Boerhaave, 1. By wafhing the mouth with certain liquors. 2. By the flow and protracted maftication of fome vifcid matter, fuch as maftich, wax, and myrrh, efpecially if acrid fubftances are mixed with thefe, fuch as pellitory of Spain, pyrethrum, ginger, and pepper. 3. By drawing into the mouth acrid and irritating vapours, fuch as thofe of tobacco, fage, rofemary, marjoram, thyme, and mother of thyme. 4. A falivation is excellently excited by the action of fuch medicines as produce a gentle but long continued naufea, fuch as antimony neither entirely fixed nor totally emetic, taken with a fmall quantity of common vitriol. 5. By fuch fubftances as totally diffolve all the parts of the blood, convert it into lymph, and render it fit for a difcharge by way of faliva; fuch as crude quick-filver, cinnabar, a folution of quick-filver in aqua fortis, white precipitate, red precipitate, turbith mineral, and fublimate mercury diffolved: the action of thofe medicines is promoted by warm fomentations applied to the head, neck, and face. An exceffive falivation is leffened or ftopped, 1. By a large and continual ufe of mild and tepid drinks, fuch as decoctions of mallows and liquorice in milk and water. 2. By allaying the impetus of the humours, by means of mild, oleous, and anodyne emulfions, with a proper addition of diacodium or opium. And, 3. By making a revulfion of the humours to other parts, efpecially that by ftool. But great caution is neceffary, left the impetus of the moved matter, which in this cafe is always acrid, fhould rufh to other parts, and produce a greater danger.

The regular, fafeft, and moft commodious method of falivation is by mercurius dulcis fix times fublimed, given inwardly in the milder pox, *&c.* or by mercurial unction, when the difeafe is got into the bones. According to Turner, fifteen grains of mercurius dulcis may be given in a morning, and a like dofe at night, with electuary of fcordium. After three, four, or five days, with this management, the fauces are obferved to inflame, the infide of the cheeks to tumify, the tongue to look white and foul, the gums to ftand out, the breath to ftink, and the whole infide of the mouth to appear fhining and lie in furrows as if parboiled. The patient now refufes nourifhment, while all parts of his chaps are fo fwelled and fore that he cannot chew any folid food, but is forced to take liquids and the fofter aliments. They are now frequently fick, and throw up a thin phlegm. The infide of the mouth thus beginning to be whealed, will foon be ulcerated, efpecially about the falival glands, which empty themfelves thereinto. Now it may be proper

proper to desist a day or two, to observe the increase of the ulcers, what sloughs are like to be raised, and what their depth and dimensions are like to prove, from which a near conjecture may be made of the duration as well as quantity of the spitting now begun, and the consistence of the drilling lympha. The salivation thus begun, the patient is to be sometimes refreshed by a little mulled wine. Let his diet be small chicken-broth, water-gruel, and panada; his drink small sack-whey, or posset-drink, and a draught of good small beer, with a toast, between whiles; and in case of gripes or a looseness, the white decoction.

Thus, after some days respite, if the patient is hearty, his chaps but little swelled on the outside, and as little sore within, the ulcers not increasing, and the flux inconsiderable, you may give one scruple of mercurius dulcis in electuary of scordium at going to rest, repeating it two or three days following, as you find occasion; or you may vomit him with eight or ten grains of turpeth mineral, in conserve of roses: but if the salivation cannot be raised to any quantity, you must forbear, and purge it off, and give calomel once or twice a week, and purge it off the next day, or two days after. When the spitting goes well forward, it may be left to take its course, till it decline of itself, which, in proportion to the ulcers and thickness of the sloughs about the mouth, may happen at the end of twenty-one days, or a month from its first rising; that is, from the time of spitting a pint and a half a day, till it come to three pints or even five pints in twenty-four hours, then it gradually goes off again.

In the more stubborn and rebellious pox, *&c.* attended with grievous symptoms, such as rotten bones, *&c.* and the patient has been used to mercurials, or salivated before, then the cure must be attempted with salivation by unction. To this end mix an ounce of quicksilver with three ounces of axungia, of which an eighth part is to be used night and morning, letting the patient rub it with his own hands gently by the fire, beginning with his ancles, up to his shins and knees, all round his joints, and so to his thighs, which are presently after to be covered with yarn-stockings and flannel-drawers; then let him use the remainder of his eighth part about his elbows and shoulders, wiping his hands clean about the glands of his arm-pits, or those of his groin: his body, during the unction, should be screened from the cold with a blanket hung behind him, and then be wrapped up in warm flannel, that is, a flannel-shirt, waistcoat, drawers, cap, and muffler. And the same is requisite in the former way, to defend the patient from the cold air. The weak need only to anoint once a day; but those that are strong, may take a fourth part of the ointment, and rub it in at once every night; after which let him get between flannel-sheets or blankets, disposing him to a gentle breathing sweat with a draught of warm posset, mace-ale, or if very feeble, with a cup of mulled wine. If, when the ointment is divided into four parts, after the third unction, the patient begins to complain of his chaps, you may stay a day or two before you proceed farther; the same when gripes or bloody stools approach. On the other hand, if an ounce or an ounce and an half of quicksilver will not do, give the turpeth, as before directed: and if the spitting declines too suddenly, give a scruple of calomel every day, for two or three times, as you see occasion. When the salivation is going off, the patient may be purged with two or three ounces of the common infusion of senna, and one ounce of the syrup of buckthorn.

For the several diseases that supervene a salivation, see each of them separately treated of, under their several heads.

To prevent the jaws from being locked up, it is necessary to use a bit of stick, covered with a soft rag, to be held between his backward teeth; and if there should happen an adhesion of the inside of the cheek to the gum, the same is to be carefully divided. If, during the salivation, a blood-vessel burst open, it is to be closed up with a little pellet, covered with powder of alum or vitriol, and dipped in the tinctura styptica: if it happens from the separation of sloughs from the sides of the cheeks, a little oxycrate held in the mouth will do the business. If the patient has been without a stool for some time, give him an emollient clyster of warm milk, sugar, and oil: and if the fauces should suddenly tumify, so as to endanger a suffocation, the most certain relief is to bring the humours downwards by sharp clysters and cathartics.

The patient should be prepared for a salivation by a lenitive purge or two; and if plethoric, he should bleed: likewise bathing

bathing in water warm, for some hot, lean, emaciated people, has been found of service. Women should be laid down just after their menstrual flux is over. Temperate weather is the most suitable.

SALIX, the WILLOW, in botany, a genus of the dioecia-diandria class of plants, having no flower-petals; the nectarium is a very small, cylindric, truncated, melliferous gland, in the center of the flower; the common amentum is oblong, and every where imbricated with oblong, plane, and patent squammæ, consisting of a single flower; the fruit is an ovato-subulated capsule, formed of two valves, and containing only one cell, in which there are several very small oval seeds, crowned with down.

The leaves of the willow are a very grateful food to cattle: a decoction of them is very good in a hæmoptoe; and a clyster is prepared of the same, for a dysentery. Externally they are of service in baths for the feet, in order to procure sleep, and cool the heat of fevers; the bark has the like virtues; and besides, the ashes thereof are reckoned effectual for extirpating warts and corns.

SALEE, a port-town of the empire of Morocco, in the kingdom of Fez, situated on the coast of the Atlantic ocean: west long. 7°, and north lat. 34°.

SALLET, or SALLAD, a dish of eatable herbs, ordinarily accompanying roast meat, composed chiefly of crude fresh herbage, seasoned with salt, oil, and vinegar: some add mustard, hard eggs, and sugar; others pepper; and others spices, with orange-peel, saffron, *&c.* The principal sallet-herbs, and those which ordinarily make the basis of our sallets, are lettuce, celeri, endive, cresses, raddish and rape; to which are sometimes added purslane, spinnach, sorrel, tarragon, burnet, corn-sallet, and chervil.

SALLY, in architecture, is what we more usually call projecture. See the article PROJECTURE.

SALLY, in the military art, the issuing out of the besieged, from their town or fort, and falling upon the besiegers in their works, in order to cut them off, nail their cannon, hinder the progress of their approaches, destroy their works, *&c.*

SALM, a town of Germany, in the dutchy of Lorrain, forty-five miles south-east of Nancy.

SALMO, SALMON, in ichthyology, a genus of the malacopterygious class of fishes, having large, sharp, and strong teeth in both jaws, and on the palate, tongue, and fauces; the back-fin is placed nearer the head of the fish than the ventral ones; the body is, in most of the species, variegated with spots; and the branchiostege membrane contains ten, eleven, or twelve bones. The several species of this fish are the common salmon, the trout, the red charr, *&c.* See the article TROUT, *&c.*

The common salmo, or salmon, with the rostrum extending beyond the lower jaw, is an inhabitant both of the sea and rivers; the head is small in proportion to the body; the eyes are round, and their iris of a silvery colour, with a faint admixture of green; the pupil is black; the covering of the gills is of a silvery colour, and are composed of two, or rather of four bony laminæ, and of twelve broad and somewhat crooked bones, connected by a membrane; there are some irregular black spots on them; the lateral line is very straight; the scales are moderately large, and placed in an imbricated manner; there is a single series of teeth in the upper and under jaw; there are two more teeth in the upper than the lower jaw; at the sides of the palate there are two series of teeth in longitudinal lines; the palate itself is entirely smooth, but deep in the fauces; the tongue is thick, and has on it a few sharp teeth; there are two fins on the back, the one having fifteen rays, and the other none at all.

SALON, or SALOON, in architecture, a very lofty spacious hall, vaulted at top, and sometimes comprehending two stories or ranges of windows. The salon is a grand room in the middle of a building, or at the head of a gallery, *&c.* Its faces or sides ought all to have a symmetry with each other; and as it usually takes up the height of two stories, its ceiling, as Daviler observes, should be with a moderate sweep. Salons are frequently built square, and sometimes octogonal.

SALON is also the name of a town of Provence, in France, twenty-four miles south-west of Marseilles.

SALONA, a port-town of Dalmatia, subject to Venice: east long. 18°, north lat. 43° 15′.

SALONICHI, a city and port-town of Macedon, in Turky, anciently called Thessa-

Theſſalonica, two hundred and ſixty miles weſt of Conſtantinople: eaſt long. 24°, north lat. 41°.

SALPA, in ichthyology, a ſpecies of the ſparus, with eleven parallel longitudinal yellow lines on each ſide. See SPARUS.

SALSETTE, an iſland on the weſtern coaſt of the hither India, ſeparated from that of Bombay by a narrow channel: it belongs to the Portugueſe, and is twenty miles long, and ſeventeen broad.

SALSES, a town of Rouſſillon, ten miles north of Perpignan, and ſubject to France.

SALSOLA, in botany, the name by which Linnæus calls the kali of other botaniſts. See the article KALI.

SALSONNA, a town of Catalonia, in Spain, forty-ſix miles north-weſt of Barcelona.

SALT, *ſal*, in natural hiſtory, the name of a ſeries or ſubdiviſion of foſſils, naturally and eſſentially ſimple, not inflammable, and ſoluble in water.

Dr. Shaw defines ſalt to be a ſubſtance that readily diſſolves in water, taſtes ſharp or pungent upon the tongue, and has a great diſpoſition to unite with earth, ſo as to appear in a ſolid form; as in common ſalt, alum, &c.

Salts then are foſſile bodies, friable, pellucid, not inflammable, but fuſible by fire, and congealing again in the cold; ſoluble in water, ſo as to diſappear in it, naturally concreting into regularly figured cryſtals, and impreſſing a ſenſation of acrimony on the tongue. Theſe are the characters and qualities common to all ſalts, and to no other bodies: and theſe they always manifeſt when pure and freed from heterogeneous ſubſtances; but in the ſtate in which they are naturally found in the earth, though they have that in their taſte alone which may ſufficiently diſtinguiſh them, yet they do not exhibit all their genuine characters: ſome of them being found ſolid and pure, either within the earth or on its ſurface, but commonly without their proper form; others embodied in earths and ſtones, as the particles or metals in their ores; and others in a fluid ſtate ſuſpended in waters.

Of the foſſils of this claſs, nature therefore affords us three diſtinct orders, and under thoſe they are diſtinguiſhable into five genera. The ſalts of the firſt order are thoſe found native and pure, either in the earth or without its ſurface, and exhibiting all other natural characters, though often without their proper form. Of the ſecond, are thoſe found not native, but in form of ores, never pure, but diſtinguiſhable by their taſte, and immerſed in and blended with the conſtituent matter of earths and ſtones in extremely ſmall particles. And of the third are thoſe naturally found ſuſpended in waters, and in a fluid form, but ready to aſſume their proper figures on the evaporation of a part of that water.

Of the firſt of theſe orders are the common alimentary ſalt or muria, and the natrum or nitre of the antients; of the ſecond are alum and nitre; and of the third are borax and halcryptium, an alkaline ſalt hid in the chalybeate waters. See the articles NATRUM, ALUM, NITRE, BORAX, and HALCRYPTIUM.

Alimentary ſalt, or muria, is found under a great variety of forms in its different ſtates; but is immediately diſtinguiſhed by applying it to the tongue, and always aſſumes a cubic, pyramidal, or parallelopiped figure after ſolution, and a regular cryſtallization. It is ſuſtained in vaſt quantities in a liquid form among ſea-water, and that of ſalt-ſprings; but is alſo found ſolid in the bowels of the earth in vaſt maſſes, which are either of a fine pellucid ſtructure, and called ſal-gem; or variouſly debaſed and ſtriated, reſembling the fibroſe talcs, and is the ſal ammoniac of the antients. See the article AMMONIAC.

But in which ever of theſe forms this ſalt is found, it affords the ſame cryſtals on evaporation: theſe, according to the degree of heat uſed in the evaporation, are either pyramidal, cubic, or parallelopiped. All theſe ſalts are ſoluble in water, but they require different quantities of it to diſſove them, and this makes one of their criterions. This ſalt requires thrice and one ſeventh part its own quantity of water, to make a perfect ſolution.

The ſea-water, in different parts of the world, is very differently ſated with it, ſome parts containing twice as much as others. But that of the ſalt ſprings is always much more ſalted with it, than the ſtrongeſt of the ſea-water: in ſome places it is found loaded with nearly as much as it could be made to contain, ſome ſprings yielding a brine that affords near a quarter of a pound of ſalt, from the pound weight of this liquor, and many of them being ſo ſtrongly impregnated, that the workmen are obliged to let them down or lower them, by

mixing them with a large quantity of sea or common water, before they are fit to be boiled for the salt: the common run of sea-water does not hold so much as one fourth part of this quantity, some not one eighth of it.

The salt produced from the sea-water of all the parts of the world, and from the brine of all the springs of the world, is absolutely the same; but differs in strength, and some other qualities, according to the operation by which it is made. In general, the quicker the liquor is evaporated, the weaker is the salt; the more time is employed in the process, the stronger. This is not wonderful, when we consider, that, over a gentle heat, water alone, or almost alone, evaporates from the liquor, but, over a more violent fire, a part of the strength or acid of the salt is raised with it.

It is upon this principle, and owing to this cause, that we find the salt of our salt springs, which is usually sold us under the name of basket-salt, the weakest of all. It is not that there is any difference in the waters from which these several kinds of salt are produced, that they appear to us in different degrees of strength, but that the people who work the brine-pits, make the salt with less expence of the workman's time; that the sea-salt is formed over somewhat slower fires, and that the bay salt is made only by the sun's heat, where the process is very long, and the heat very moderate, and the salt is found strong in proportion. This is so indisputable a truth, that once every week, a very strong salt, little inferior to bay-salt in that quality, is made at the brine pit works, where the common run of the salt is the weakest in the world. The liquor is the same in this case, but the workmen who do not work on Sundays, leave a pan full to evaporate slowly over the fire, which they prepare on the Saturday night, and the moderate heat and length of time under which this weekly parcel of salt is made, render it very different from the common salt of the works, both in form and qualities: it is found to be made up of large and hard grains, instead of the small and soft ones of the common kind, and is vastly superior to it in strength.

This circumstance, overlooked by the workmen, and even by their masters too, for many years, gave the hint to Mr. Lownds, and afterwards to the very ingenious Dr. Browning, author of an excellent treatise on this subject, to propose to the government a new method of making a strong salt fit for all the purposes for which they buy it of our neighbours, only by a new, that is, a slower way of working our own brines. The latter of these gentlemen has proved, incontestably, that we may, if we will encourage proper manufactures, have common salt of every kind made at home, equal in strength, and equally fit for all purposes, with the salt of any part of the world.

After these accounts of the muria or common salt under its different forms, and as expressed by different names, it remains to treat of its qualities and virtues in general.

It resolves spontaneously in the air, but this in different times, according to the dampness or driness of that element, and according to its own laxer or firmer structure. The coarser salts dissolve sooner than the finer, and there are even some pieces of sal gemmæ so firm, that they are scarce to be at all affected, even on their surface, by the moistest common air.

Common salt, added to aqua fortis, enables it to dissolve gold, making it into what is called aqua regia; by distillation it yields a strong and acid spirit; it is the most, of all substances, endued with keeping animal bodies from putrefaction, and it also preserves vegetables in the same manner in long digestions. In medicine, it is a common ingredient in clysters, and serves to soften and bring away indurated fæces. Suppositories are also made of a mixture of it with honey, and are put up the fundament, to promote a tendency to defuctions. Aloes and colocynth are sometimes added on these occasions, when there is required more power in the medicine. In apoplectic cases, it is generally an ingredient among the stimulating things administered in clysters; only it is necessary to have this caution, that if there appear reason to suspect an inflammation of the intestines, or but a tendency to it, every thing of this kind is to be avoided.

Common salt that has not been exposed to the fire, makes no change in the colour of syrup of violets; it does not make any effervescence with oil of tartar, nor does it make lime-water turbid, but added to spirit of sal armoniac, it manifests some signs of a latent acidity, by rendering it cloudy: on the contrary, also, it manifests

fells something of an alkaline nature, by rendering a solution of mercury whitish; and it raises an effervescence with oil of vitriol, attended with heat.

On solution in water, common salt manifests also two very different principles after evaporation. When reduced to a proper consistence, that is, when the quantity of water is not more than as three to one to that of the salt, a part of it concretes into grains of salt of the ordinary kind; but there remains yet in the liquor, after all that can be separated this way has been procured, a strong taste of a saline nature: the salt that gives it this, will never be brought to crystallize, but must be separated by evaporating all the liquor away; it is then found to be of an alkaline nature, assuming no regular form in its crystals, and easily imbibing the humidity of the air, and running into a liquor with it.

The basis of sea-salt, therefore, is a mineral alkali, which is so intimately blended with its peculiar acid, that the latter has scarce any power of exerting itself. The acid, drawn by distillation from sea-salt, turns the syrup of violets red, and ferments vehemently, though without heat, with oil of tartar, but it does not heat on being poured into lime-water. This spirit is the only one that can be properly called a solvent for gold and for tin, but silver and lead resist it. The acids of nitre and vitriol, also, obtain the same qualities on being mixed with it, and become aquæ regales. If this acid be perfectly saturated with salt of tartar, crystals of the form and qualities of those of common salt may be obtained from the mixture; these crystals are called regenerated sea-salt, and serve to prove what we observed above, that an alkali is the basis of sea-salt, and that more alkalies than one may serve to that purpose with the peculiar acid, which is the essential part of this salt.

Physicians are of opinion, that sea-salt has the same effects in the human body that it has out of it, in checking fermentation, and preventing putrefaction; they therefore esteem it of good use mixed with the generality of our foods in the stomach: they are of opinion also, that it carries its effect into the blood, and has the qualities of a moderate drier, detergent and attenuant, added to those of a stimulant, which common reason declares it to be. Hence may be deduced all the virtues attributed to salt, as an aperient, stomachic, or warming medicine, and a provocative to venery; but in what degree it possesses all these qualities, we are, by its universal use in foods, prevented from being able to determine. Van Helmont recommends it as a good preservative against the stone and gravel: he has been severely censured for this by others, who are of opinion, that all salted foods, such as salt beef, and the like, are very bad in those cases: but both parties may be in the right; for there is a great deal of difference between common salt eaten with the fresh juices of our food, and the brine and pickle into which it runs in the time of its being left upon the meat preserved by it. Salt is very properly put into the mouths of people in apoplectic fits, as it not only irritates but attenuates the juices there, and promotes a discharge of them; and in a palsy which affects the tongue, a sage-leaf, bruised and covered with salt, has been a famous remedy among the good women, and not without reason.

Mixed with bran, and heated in a canvas bag, it is recommended to be applied externally to the head in head-achs, arising from a moist cause, and in defluxions; and we find the old physicians very strenuously recommending a cataplasm made of the same ingredients for pains.

*Methods of making alimentary* SALT are these. 1. By the evaporation of the sun's rays: this is the most easy and simple method of all, when the waters of ponds and lakes, whether natural or artificial, impregnated with salt, being wholly exhaled by the force of the sun and air, the salt is left concreted into a hard crust at the bottom of the lake, and is what commonly goes by the name of bay-salt; the crystals of which differ in size, according to the different degrees of heat, and the time it lies in the pits. All bay-salt has some mud, slime, or the like, in the making, and some kinds are mixed with the bittern-salt, or what is called Epsom salt; they are all more white while dry, and more pellucid when moist, and they differ in colour, according to the earth which makes the bottoms of the pits. Thus some of the french bay-salt is grey, some reddish, and some white, according as a blue clay has lined the pits, or a red or white one. Some kinds have an agreeable smell in large heaps; such are the Portugal, and the Hampshire bay-salts; and this

this ſeems owing to the ſea-water they were made from, having a bituminous matter in it. It differs alſo greatly in taſte, according to the various foreign mixtures it contains; and it will often alter in taſte, and other qualities, by long keeping: for, in general, it is much fitter for uſe, after it has been kept ſome time in a dry place, than when it is firſt made.

2. By boiling or coction; the moſt convenient works for which proceſs are conſtructed in the following manner: the ſaltern or boiling houſe, is erected near the ſea-ſhore, and is furniſhed with a furnace, and one or two large pans, which are commonly made of iron-plates, joined together with nails, and the joints filled with a ſtrong cement; and the bottoms of the pans are prevented from bending down, by being ſupported by ſtrong iron-bars.

The ſalt-pan being filled with ſea-water, a ſtrong fire of pit-coal is lighted in the furnace, and then, for a pan which contains about fourteen hundred gallons, the ſalt-boiler takes the whites of three eggs, and incorporates them all with two or three gallons of ſea-water, which he pours into the ſalt-pan, while the water contained therein is only lukewarm, and mixes this with the reſt by ſtirring it about with a rake. In many places they uſe, inſtead of eggs, the blood of ſheep or oxen to clarify the ſea-water; and in Scotland they do not give themſelves the trouble to clarify it at all. As the water heats, there ariſes a black frothy ſcum upon it, which is to be taken off with wooden ſkimmers. After this the water appears perfectly clear, and by boiling it briſkly about four hours, a pan loaded in the common way, that is about fifteen inches deep, will begin to form cryſtals upon its ſurface. The pan is then filled up a ſecond time with freſh ſea-water; and about the time when it is half filled, the ſcratch-pans are taken out and emptied of a white powder, ſeeming a kind of calcarious earth, which ſeparates itſelf from the ſea-waer, during its boiling, before the ſalt begins to ſhoot. When theſe have been emptied, they are again put into their places, where they are afterwards filled again. This powder being violently agitated by the boiling liquor, does not ſubſide till it comes to the corners of the pan, where the motion of the maſs is ſmaller, and it there falls into theſe pans placed on purpoſe to receive it.

The ſecond filling of the pan is boiled down after clarifying in the ſame manner as the firſt, and ſo a third and a fourth; but in the evaporation of the fourth, when the cryſtals begin to form themſelves, they ſlacken the fire, and only keep the liquor ſimmering. In this heat they keep it all the while that the ſalt is granulating, which is nine or ten hours. The granules or cryſtals all fall to the bottom of the pan; and when the water is almoſt all evaporated, and the ſalt lies nearly dry at the bottom, they rake it all together into a long heap on one ſide of the pan, where it lies a while to drain from the brine, and then is put into barrows and carried to the ſtore-houſe, and delivered into the cuſtody of his majeſty's officers. In this manner the whole proceſs is uſually performed in twenty-four hours, the ſalt being commonly drawn out every morning. This is the method in moſt of our ſalt-works, but in ſome they fill the pan ſeven times before they boil up the ſalt, and ſo take it out but once in two days, or five times in a fortnight. In the common way of four boilings, a pan of the uſual ſize, containing one thouſand three hundred gallons, they draw from fifteen to twenty buſhels of ſalt every day, each buſhel weighing fifty-ſix pounds.

When the ſalt is carried into the ſtore-houſe, it is put into drabs, which are partitions, like ſtalls for horſes, lined at three ſides, and the bottom with boards, and having a ſliding board on the fore-ſide to draw up on occaſion. The bottoms are made ſhelving, being higheſt at the back, and gradually inclining forward; by this means the brine remaining among the ſalt, eaſily ſeparates and runs from it, and the ſalt in three or four days becomes ſufficiently dry; in ſome places they uſe cribs and barrows, which are long and conic wicker-baſkets, for this purpoſe; and in ſome places wooden troughs with holes in the bottom. The ſaline liquor which remains from the making of ſalt, is what is called bittern. See the article Bittern.

Much in the ſame manner is the ſalt obtained from the brine of ſalt ſprings, pits, &c. White ſalt is prepared from ſea-water, or any other kind of ſalt-water, firſt heightened into a ſtrong brine by the heat of the ſun, and the operation

of the air. It may alſo be prepared from a ſtrong brine, or lixivium, drawn from earths, ſtones, or ſands, ſtrongly impregnated with common ſalt. Refined rock-ſalt is that obtained by diſſolving foſſil or rock-ſalt in ſalt of freſh water, and afterwards boiling the ſolution. And, laſtly, ſalt upon ſalt is made from bay-ſalt diſſolved in ſea-water, or other water, and boiled to a white ſalt.

*Preparations of common* SALT, in uſe in the ſhops, are, 1. Decrepitated ſalt, thus made: put a quantity of ſalt in an earthen veſſel capable of bearing the action of the fire, cover it with a lid, and ſet it on a moderately ſtrong charcoal fire, heaping up the coals about it as high as the ſalt reaches within; let the lid be taken off at times, and the matter ſtirred well about with an iron-ſpatula. It will make a violent crackling for a long time, but at length the noiſe will ceaſe, and the ſalt be reduced to a dry powder; this is decrepitated ſalt. It is uſed in the cementation of metals, in many other chemical and metallurgical operations, and in diſtilling the acid ſpirit from the ſalt, much trouble and time being ſaved by this previous calcination, though none of the ſpirit will be diſſipated by it. 2. The acid ſpirit of ſea-ſalt, which may be diſtilled by the retort, by mixing two parts of pipe-clay, or the like earth, with one part of decrepitated ſalt; forming the whole into balls with water, and diſtilling theſe after they are dried, in a reverberatory furnace, with a coated retort and a large receiver. Another method of obtaining this ſpirit is this: take ſea-ſalt and oil of vitriol, of each an equal quantity; of common water, a fourth part of the weight of the whole: mix the water and the oil of vitriol together, in an earthen veſſel; then pour them into a retort, and add to them the ſalt by ſmall quantities at a time: fit on a receiver, and diſtil the ſpirit by a fire, gentle at firſt, but afterwards raiſed to a conſiderable ſtrength. The mixture of theſe ingredients ſhould be made under a chimney, and the vapours carefully avoided, as being of the moſt fatal ſuffocating kind. This ſpirit is uſed in many metallurgic operations. 3. The ſweet ſpirit of ſalt, made thus: mix together three parts of rectified ſpirit of wine, and one part of ſpirit of ſalt; let them ſtand in digeſtion three weeks or a month, in a tall matraſs. The mixture will in this time acquire a very fragrant ſmell, and is to be preſerved for uſe. It is given in the ſame caſes with the ſweet ſpirit of nitre, and promotes the diſcharges by urine, and therefore is good in the gravel and dropſies: it is alſo recommended in malignant fevers and hernias; its doſe being from five to fifteen drops, in any convenient vehicle. 5. Glauber's ſalt, a very cheap cathartic or purging ſalt. See GLAUBER'S SALT.

SALT, in chemiſtry, makes one of the leading and moſt active principles, or elements, procurable from mixt bodies. See PRINCIPLE and ELEMENT.

There are three kinds thus obtained, two whereof are volatile, and the third fixed. The volatile, are acrid and urinous ſalts; the fixed, lixivious, or thoſe drawn from aſhes: the urinous and lixivious ſalts are alſo called alkalies, or alkalious ſalts; the former being volatile, and the latter fixed. We do not know the preciſe figure of each of theſe ſalts; but to judge of them by their effects, acid ſalts ſhould ſeem to be pointed, and thoſe points tipped with ſulphureous matter: whereas the urinous and lixivious ſalts ſeem to be like a ſponge, containing a part of the acid, and a little fetid oil. See ACID, ALKALI, and LIXIVIOUS.

Acid ſalts are ranged, by Homberg, under three claſſes, *viz.* ſuch as contain an animal or vegetable ſulphur; as all the acids diſtilled from plants, fruits, woods, *&c.* and ſpirit of nitre: ſuch as contain a bituminous ſulphur, to which belong the acids of vitriol, common ſulphur, and alum: and ſuch as contain a more fixed mineral ſulphur; as the acids drawn from the ſea-ſalt, and ſal gem. Thoſe of the firſt claſs act more ſwiftly than thoſe of the others, and thoſe of the ſecond are the leaſt nimble. Acid ſalts, joined with lixivious ones, compoſe mixed or intermediate ſalts: thus, ſpirit of nitre, with ſalt of tartar, produce a true ſaltpetre; ſpirit of ſalt, with ſalt of tartar, produce true common ſalt; and ſpirit of vitriol, with ſalt of tartar, produce true vitriol; which are all mixed or intermediate ſalts, *i. e.* partly fixed and partly volatile, the ingredients ſtill retaining their original natures. Acids, joined with urinous ſalts, compoſe another ſalt called ammoniac ſalts, which are always volatile.

In all native ſalts, both foſſil, vegetable, and animal, after the violence of the fire has ſeparated all the volatile parts, there ſtill remains a fixed ſalt, to be

 drawn

drawn from the fœces by lotion, or lixiviation; hence called a lixivious salt, which is no other but the relics of the acid salts, that the fire was not able to separate from the earth of the mixed body, but may be separated by dissolving them in common water. The taste of these lixivious salts is very different, according to the quantity of the acids still remaining after calcination; part of which is still capable of being volatilized by a more intense heat, or by dissolution, digestion, filtration, and evaporation frequently repeated; or, by adding some urinous salt, to absorb the same.

We have three sorts of urinous salts, *viz.* that of plants or animals, which is the same; the second is fossil; and the third of an intermediate kind, partaking both of the fossil and vegetable nature; the first is volatile, and the two latter fixed. By urinous salts, we mean all such as partake of the taste or smell of urine; their effect in volatilizing fixed salts is well known; for being added to common salt, there arises, by fire, a volatile salt, called sal ammoniac. However, for volatilizing the fixed salts of plants, the urinous salts of plants are not so proper as the urinous salts of the intermediate class, such as alum; and for the fixed salts of fossils, the urinous salt is fittest, *viz.* borax.

All the sorts of salts, then, appear evidently compound and unelementary; and that they are producible *de novo*, and convertible into one another is strenuously argued by Mr. Boyle. The two chief qualities wherein they all agree, he observes, are to be easily dissoluble in water, and to affect the palate, so as to cause a sense of taste. Now that a disposition to be dissoluble in a liquor, may be acquired by mixture, and a new texture of parts, appears from many instances; and as for the taste, it is some question, how far the necessity thereof may consist with another principle; for the purest oils are sapid, yet will not dissolve in water; so that there does not appear any strict connection between being sapid and soluble in that fluid.

For acid salts, we may instance in nitre; which, though it have no acid taste, may be made to afford by distillation, above three quarters of its weight, of a highly acid liquor: yet it does not appear, that such a great proportion of acid particles, or possibly any proportion at all, is employed by nature in the composition of nitre.

For urinous salts, we have an instance of their production, in the salt obtained by distillation from soot: for though the wood, we burn in our chimneys, seems to have nothing of the taste or smell of urine, nor have the dissolutions of the saline parts of such wood been observed to have any affinity, in taste or odour, thereto; yet when wood is burnt in the fire, and the soot afforded by it distilled, we get a white volatile urinous salt, like what is obtained from blood, urine, or the like.

For lixivious, or the fixed salts of calcined bodies, the chemists themselves are not entirely agreed; for however the prevailing opinion may be, that those fixed alkalies pre-exist in mixed bodies, Helmont very ingeniously proposes another origin, and holds them, as to their alkaline form, productions of the fire, by whose violent action a part of the salt, which in the concrete is all naturally volatile, laying hold of some parts of the sulphur of the same body, both become melted together, and thus fixed into an alkali.

It would, no doubt, contribute greatly to the improvement of chemistry, and natural philosophy, to form a table of the time and quantity wherein all the known salts are dissoluble in water. Epsom-salt presently dissolves in about an equal quantity of water; common salt dissolves in about four times; nitre, in about five or six times; and salt of tartar, in about twice its own quantity of water; but cream of tartar requires twenty times its own quantity of boiling water, to dissolve it. Such a table, regularly formed, might ease the trouble of refining salts; by shewing, at once, how much water each salt requires to dissolve it, for clarification, or crystallization. It would likewise supply us with a ready and commodious way of separating any mixture of salts, by shewing which would shoot out of the mixture first upon crystallization: for the rule is, that the salt which requires the largest proportion of water to dissolve it, will shoot the first; and thus it is, that nitre is totally separated from common salt, in the ordinary process for refining it. The same table might also direct us to a ready method of separating two salts, without waiting for crystallization: thus suppose

suppose tartar of vitriol were mixed with epsom-salt, if water be poured upon the mixture, it will presently drink in the epsom-salt, leaving the tartar of vitriol untouched; and the same is to be understood of other mixtures of salts.

If, says Dr. Shaw, the physical reason be demanded, why one salt more readily dissolves in water than another, we recommend it to farther examination, whether all sorts do not dissolve in water with greater or less facility, and in greater or less proportion, according as they contain more or less of a gross, unctuous substance, unsuitable to the nature or fineness and lubricity of parts required in water. The comparing epsom-salt, salt of tartar, common salt, *&c.* with nitre, alum, crude tartar, *&c.* he thinks will make this more than a conjecture. Hence, in order to lessen the trouble and expence of procuring the volatile salt of animal subjects, they should be first purged of their oil and unctuous parts, by boiling in water; after which, they will afford volatile salts and spirits, as pure, or purer, than those obtained from unboiled hartshorn.

The same gentleman observes farther, that the unrectified volatile salts of vegetable and animal substances, are true sales volatiles oleosi; and according to the difference of the oil wherein they abound, they are properly distinguished into salt of hartshorn, of ox-bone, of human blood, of silk, *&c.* But that when these oils are totally separated from them, they become one and the same undistinguishable volatile salt; for that it is the admixture of oil that gives the colour to volatile salts, they being permanently white when the oil is separated. These volatile salts are obtainable from all kinds of land-animals, the amphibious and subterraneous tribe, birds, fishes, and reptiles; also from alkaline vegetables without putrefaction, and from other vegetables after putrefaction; from soot, horns, hoofs, and all refuse of animal and vegetable matters, as urine, the blood of slaughter-houses, *&c.* and this as pure and perfect as from hartshorn; whence volatile alkalies, and sal ammoniac, might be afforded very cheap.

The volatile animal, and fixed vegetable salts, differ chiefly with regard to their volatility, and fixedness, and the effects thereon depending; but agree in other respects: thus they both make an effervescence, and turn neutral, when saturated with acids; they are both corrosive, hot, and fiery, *&c.*

SALT WATER, or SEA WATER. See the article SEA.

SALT, or SAULT, in the manege, the same with leap. See LEAP.

SALTASH, a borough of Cornwal, which sends two members to parliament, and is situated 20 miles south of Launceston.

SALTIER, in heraldry, an ordinary in form of a St. Andrew's cross; which may be said to be composed of a bend dexter and sinister, crossing each other in the center of the escutcheon. See plate CCXXXVI. fig. 3.

SALT-PETRE, the same with nitre. See the article NITRE.

SALTSBURG, the capital of an archbishopric of the same name, in Bavaria, situated on the river Saltza, seventy miles east of Munich: east long. 13°, north lat. 47° 45′.

SALVADORA, in botany, a genus of the tetrandria-monogynia class of plants, the calyx of which is a single leafed perianthium, cut into four revolute segments; there is no corolla, the fruit is a globular berry, containing only one cell; the seed is single and spherical.

SALVAGE MONEY, a reward allowed by the civil and statute law, for the saving of ships or goods from the danger of the seas, pirates, or enemies.

Where any ship is in danger of being stranded, or driven on shore, justices of the peace are to command the constables to assemble as many persons as are necessary to preserve it; and on its being preserved by their means, the persons assisting therein shall in thirty days after be paid a reasonable reward for the salvage, otherwise the ship or goods shall remain in the custody of the officers of the customs, as a security for the same.

SALVATELLA, in anatomy, a branch of the axillary vein, which runs over the back of the hand towards the little finger.

SALVATERRA, a town of Spain, in the province of Estremadura: west long. 7° 5′, north lat. 38° 30′.

SALVATIERRA, a town of Spain, in the province of Galicia, fifty miles south of Compostella.

SALVE REGINA, among the romanists, a latin prayer addressed to the Virgin Mary, and sung after complines; also at the execution of criminals.

SALVER, a plate, commonly of silver, and supported with a foot; used to set glasses

glaſſes on, to ſerve wine and other liquors.

SALVIA, *ſage*, in botany, *&c.* See SAGE.

SALUTATION, the act of ſaluting, greeting, or paying reſpect and reverence to any one.

There is a great variety in the forms of ſalutation. The orientals ſalute by uncovering their feet, laying their hands on their breaſts, *&c.* In England, we ſalute by uncovering the head, bending the body, *&c.* The pope makes no reverence to any mortal, except the emperor, to whom he ſtoops a very little, when he permits him to kiſs his lips. A prince, or perſon of extraordinary quality, is ſaluted at his entering a garriſon by the firing of the cannon round the place. In the field, when a regiment is to be reviewed by a king, or his general, the drums beat, as he approaches, and the officers ſalute him one after another, as he paſſes by, ſtepping back with the right foot and hand, bowing their half pikes to the ground, and then recovering them gently, bringing up the foot and hand, and planting them; which done, they pull off their hats without bowing. The enſigns ſalute all together, bringing down their colours near the ground directly before them at one motion, and having taken them up again, gently lift their hats.

At ſea, they ſalute by a diſcharge of cannon, which is greater or leſs, according to the degree of reſpect they would ſhew; and here ſhips always ſalute with an odd number of guns, and galleys with an even one. To ſalute with muſkets is to fire one, two, or three volleys; which is a method of ſalutation that ſometimes precedes that of cannon, and is chiefly uſed on occaſion of feaſts. After the cannon, they alſo ſometimes ſalute or hail with the voice, by a joint ſhout of all the ſhip's company, repeated three times; which ſalutation alſo occaſionally obtains where they carry no guns, or do not care to diſcharge any. Saluting with the flag is performed two ways, either by holding it cloſe to the ſtaff ſo as it cannot flutter, or by ſtriking it ſo as it cannot be ſeen at all, which is the moſt reſpectful. Saluting with the ſails is performed by hovering the topſails half-way of the maſts. Only thoſe veſſels that carry no guns ſalute with the ſails.

SALUZZO, a city of Italy, the capital of a marquiſate of the ſame name in Piedmont, ſeventeen miles ſouth of Turin.



SALZ, SULZ, SALTZ, or SULTZ, a ſort of brine or pickle made of ſalt diſſolved by the coldneſs or moiſture of a cellar.

SAMARCAND, a city of Uſbec Tartary, formerly its capital: eaſt long 66°, north lat. 40°.

SAMARIA, an antient city of Paleſtine, in Aſiatic Turky, forty five miles north of Jeruſalem.

SAMARITANS, an antient ſect among the Jews, ſtill ſubſiſting in ſome parts of the Levant, under the ſame name.

Its origin was in the time of Rehoboam, under whoſe reign the people of Iſrael were divided into two diſtinct kingdoms, that of Judah and that of Iſrael; when the capital of the latter being Samaria, the Iſraelites obtained the name of Samaritans.

They were antiently guilty of idolatry, and the rabbins pretend, that they worſhipped the figure of a dove on mount Gerizim; but the preſent Samaritans, who are but few in number, are far from being idolaters. They celebrate the paſſover every year, on the fourteenth day of the firſt month, on mount Gerizim, and begin that feaſt with the ſacrifice appointed for that purpoſe in Exodus: they keep the ſabbath with all the rigour with which it is injoined in the book of Exodus, none among them ſtirring out of doors but to the ſynagogue: they ſacrifice no where but on mount Gerizim: they obſerve the feaſts of expiation, tabernacles, harveſt, *&c.* and never defer circumciſion beyond the eighth day; they never marry their nieces as the Jews do; have but one wife; and in fine, do nothing but what is commanded in the law.

SAMARITAN MEDALS, ſome antient medals in the cabinets of our antiquaries, the inſcriptions and legends of which are in hebrew; but the character different from the hebrew of our bibles, which is the ſquare hebrew, or chaldee; from this character, and not from their being ſtruck by the Samaritans, they are denominated Samaritan.

Of theſe there are four kinds: the firſt bear expreſsly the name of Simon, and the ſubject for which they were ſtruck, *viz.* the deliverance of Jeruſalem. The ſecond have not the name of Simon, but only the deliverance of Sion or Jeruſalem. The third have neither Simon, nor the deliverance of Sion; but only the

the epochas, firft year, fecond year, &c. The fourth clafs have neither any infcriptions, nor any thing whence we may judge of the time when they were ftruck. The three firft were certainly ftruck by the Jews, after their return from the babylonifh captivity, and in the time of Simon Maccabeus, after Jerufalem had been freed from the yoke of the greeks; but though they were ftruck after the captivity, the learned jefuit Souciet obferves, that their character fhews itfelf to be that of the antient hebrew, the ufe of which was loft by the people during their fojourning in Babylon and Chaldæa; but was again reftored after their return, on the fame footing as before.

SAMBALLAS, or SAMBLAS ISLANDS, feveral iflands fituated in the american ocean, near the coaft of Darien, none of which are inhabited; eaft long. 81° north lat. 10°.

SAMBRE, a river of the Netherlands, which rifes in the confines of Picardy, and falls into the Maefe at Namur.

SAMBUCUS, the ELDER, in botany, a genus of the pentandria-trigynia clafs of plants, the flower of which confifts of a fingle rotated femiquinquefid petal; its fruit is a roundifh unilocular berry, containing three feeds, convex on one fide, and angulated on the other.

The inner green bark of this fhrub is gently cathartic: an infufion of it in wine, or its expreffed juice, in the dofe of half an ounce, or an ounce, is faid to purge moderately; and in fmall dofes, to prove an efficacious deobftruent, capable of promoting all the fluid fecretions. The young buds, or rudiments of the leaves, are ftrongly purgative, but are reckoned unfafe. The expreffed juice, infpiffated to the confiftence of a rob, proves an ufeful aperient medicine, which is good in obftructions of the vifcera, and promotes the natural evacuations.

SAMBUCUS, is alfo an antient mufical inftrument of the wind-kind, refembling a flute; probably thus called, becaufe made of elder.

SAMIAN EARTH, in the materia medica, the name of two fpecies of marle ufed in medicine, *viz.* 1. The white kind, called by the antients, collyrium famium; being aftringent, and therefore good in diarrhæas, dyfenteries, and hæmorrhages; they alfo ufed it externally in inflammations of all kinds. 2. The brownifh-white kind, called after famius, by Diofcorides: this alfo ftands recommended as an aftringent. See MARLE.

SAMOGITIA, a maritime province of Poland, bounded by Courland on the north, and by the Baltic on the weft.

SAMOIDA, the moft northerly province of Ruffia in Europe, fituated on the frozen ocean, and the river Oby.

SAMOLUS, in botany, a genus of the pentandria-monogynia clafs of plants, the corolla whereof confifts of a fingle petal, the tube is very fhort, only the length of the cup, and patalous; the limb is plane and divided into five fegments, and there are placed five connivent fquammulæ at the bafe of the finus of the limb; the fruit is an oval capfule furrounded by the cup, and containing only one cell; the feeds are numerous oval and fmall.

SAMOS, a fertile ifland of the Archipelago, thirty miles fouth of Smyrna: eaft long. 27° 30′, north lat. 37° 30′.

SAMOSATENIANS, in church-hiftory, the fame with paulionifts. See the article PAULIONISTS.

SAMOTHRACIA, a fmall ifland in the Egean fea, near the coaft of Thrace.

SAMPSEANS, in church-hiftory, an antient fect, who were properly neither jews, chriftians, nor gentiles, though they took their name from the hebrew word *femes*, fun; as though they worfhipped that planet.

They acknowledged only one God; wafhed themfelves often; and in almoft every thing attached themfelves to the religion of the Jews. Many among them abftained wholly from eating of flefh. Scaliger will have the fampfeans to be the fame with the effeni; and indeed the fampfeans, effeni, elcefaites, and maffalians, appear to be no more than fo many different names for the fame fect.

*Books of* SAMUEL, two canonical books of the Old Teftament, fo called, as being ufually afcribed to the prophet Samuel.

The books of Samuel, and the books of Kings are a continued hiftory of the reigns of the Kings of Ifrael and Judah; for which reafon the books of Samuel are likewife ftyled the firft and fecond books of Kings. Since the firft twenty-four chapters contain all that relates to the hiftory of Samuel, and that the latter part of the firft book, and all the fecond, include the relation of events that happened after the death of that prophet, it has been fuppofed that Samuel was author only of the firft twenty-four chapters,

and

and that the prophets Gad and Nathan finiſhed the work. The firſt book of Samuel comprehends the tranſactions under the government of Eli, and Samuel; and under Saul, the firſt king; and alſo the acts of David, whilſt he lived under Saul; and is ſuppoſed to include the ſpace of an hundred and one years. The ſecond book contains the hiſtory of about forty years, and is wholly ſpent in relating the tranſactions of king David's reign.

SAMYDA, in botany, a genus of the icoſandria-monogynia claſs of plants, the calyx of which is ſituated under the germen, and it has no corolla or flower petals.

SANBENEDITO, a town of Italy, in the dutchy of Mantua, nine miles ſouth of the city of Mantua.

SAN BENITO, or SACO BENITO, a kind of linen-garment worn by perſons condemned by the inquiſition. See the articles INQUISITION and *Act of* FAITH.

SANCTIFICATION, the act of ſanctifying, or rendering a thing holy.

The reformed divines define ſanctification to be an act of God's grace, by which a perſon's deſires and affections are alienated from the world, and by which he is made to die to ſin, and to live to righteouſneſs; or, in other words, to feel an abhorrence of all vice, and a love of virtue and religion.

SANCTION, the authority given to a judicial act, by which it becomes legal and authentic.

Thus the royal aſſent gives a ſanction to all bills that have paſſed both houſes of parliament.

*Pragmatic* SANCTION. See the article PRAGMATIC SANCTION.

SANCTI VITI CHOREA. See the article VITUS'S DANCE.

SANCTUARY, among the Jews, alſo called ſanctum ſanctorum, or holy of holies, was the holieſt and moſt retired part of the temple of Jeruſalem, in which the ark of the covenant was preſerved, and into which none but the high prieſt was allowed to enter, and that only once a year, to intercede for the people. Some diſtinguiſh the ſanctuary from the ſanctum ſanctorum, and maintain that the whole temple was called the ſanctuary.

To try and examine any thing by the weight of the ſanctuary, is to examine it by a juſt and equal ſcale: becauſe, among the Jews, it was the cuſtom of the prieſts to keep ſtone weights, to ſerve as ſtandards for regulating all weights by, though theſe were not at all different from the royal, or profane weights.

Sanctuary, in the romiſh church, is alſo uſed for that part of the church in which the altar is placed, incompaſſed with a rail or baluſtrade.

SANCTUARY, in our antient cuſtoms, is the ſame with aſylum. See ASYLUM.

SAND, *arena*, in natural hiſtory, a genus of foſſils, the characters of which are, that they are found in minute concretions; forming together a kind of powder, the genuine particles of which are all of a tendency to one determinate ſhape, and appear regular, though more or leſs compleat concretions; not to be diſſolved or diſunited by water, or formed into a coherent maſs by means of it, but retaining their figure in it; tranſparent, vitrifiable by extreme heat, and not diſſoluble in, nor effervescing with, acids. Sands are ſubject to be variouſly blended both with homogene and heterogene ſubſtances, as that of talcs, &c. and hence, as well as from their various colours, are ſubdivided into, 1. White ſands, whether pure or mixed with other arenaceous or heterogeneous particles; of all which there are ſeveral ſpecies, differing no leſs in the fineneſs of their particles, than in the different degrees of colour, from a bright and ſhining white, to a browniſh, yellowiſh, greeniſh, &c. white. 2. The red and reddiſh ſands, both pure and impure. 3. The yellow ſands, whether pure or mixed, are alſo very numerous. 4. The brown ſands, diſtinguiſhed in the ſame manner. 5. The black ſands, whereof there are only two ſpecies, *viz.* a fine ſhining greyiſh-black ſand, and another of a fine ſhining reddiſh-black colour. 6. The green kind, of which there is only one known ſpecies, *viz.* a coarſe variegated duſky green ſand, common in Virginia.

Sand is of great uſe in the glaſs-manufacture; the white writing ſand being employed for making of the white glaſs, and a coarſe greeniſh-looking ſand for the green glaſs.

In agriculture, it ſeems to be the office of ſands to make unctuous earths fertile, and fit to ſupport vegetables, &c. For earth alone, we find, is liable to coaleſce, and gather into a hard coherent maſs, as appears in clay; and being thus embodied, and as it were glued together, is no way diſpoſed to nouriſh vegetables.

But

But if such earth be mixed with sand, its pores are thereby kept open, and the earth itself loose, so as thus to give room for the juices to ascend, and for plants to be nourished thereby. A vegetable planted only in sand, or in a fat glebe, or in earth, receives little growth or increase; but a mixture of both renders the mass fertile. In effect, earth is in some measure made organical by means of sand; pores and spaces, something analogous to vessels, being thereby maintained, by which the juices may be conveyed, prepared, digested, circulated, and at length discharged.

Common sand is a very good addition, by way of manure, to all sorts of clay-lands; it warms them, and makes them more open and loose. The best sand for the farmer's use is that which is washed by rains from roads or hills, or that which is taken from the beds of rivers; the common sand that is dug in pits never answers nearly so well. However, if mixed with dung, it is much better than laid on alone: and a very fine manure is made by covering the bottom of sheep-folds with several loads of sand every week, which are to be taken away, and laid on cold stiff lands, impregnated as they are with the dung and the urine of the sheep.

Beside clay-land there is another sort of ground very improveable by sand; this is that sort of black boggy land on which bushes and sedge grow naturally, and which they cut into turf, in some places. Six hundred load of sand being laid upon an acre of this land, according to the Cheshire-measure, which is near double the statute-acre, meliorate it so much, that without plowing, it will yield good crops of oats or tares, though before it would have produced scarce any thing. If this crop is taken off, the land be well dunged, and laid down for grass, it will yield a large crop of sweet hay.

Once sanding this land will improve it for a vast number of years, and it will yield two crops of hay in the year, if there be weather to make it in. Some land in Cheshire has been, by this means, rendered of twelve times its former value to the owner. The bogs of Ireland, when drained, have been rendered very fruitful land, by mixing sand in this manner among the earth, of which they consist. Add to this, that in all these boggy lands, the burning them, or firing their own turf upon them, is also a great advantage. The common peat, or turf-ashes, mixed with the sand for these purposes, add greatly to its virtue. Sea-sand, which is thrown up in creeks and other places, is by much the richest of all sand for manuring the earth; partly its saltness, and partly the fat and unctuous filth that is mixed among it, give it this great virtue. In the western parts of England, that lie upon the sea-coast, they make very great advantages of it. The fragments of sea-shells also, which are always in great abundance in this sand, add to its virtues; and it is always the more esteemed by the farmers, the more of these fragments there are among it.

The sea-sand, used as manure in different parts of the kingdom, is of three kinds: that about Plymouth, and on other of the southern coasts, is of a blue-grey colour, like ashes, which is probably owing to the shells of muscles, and other fish of that or the like colour, being broken and mixed among it in great quantity. Westward, near the land's end, the sea-sand is very white, and about the isles of Scilly it is very glistering, with small particles of talc; on the coasts of the north-sea, the sand is yellowish, brown, or reddish, and contains so great a quantity of fragments of cockle-shells, that it seems to be chiefly composed of them. That sea-sand is accounted best, which is of a reddish colour: the next in value to this is the bluish, and the white is the worst of all. Sea-sand is best when taken up from under the water, or from sand-banks, which are covered by every tide. The small grained sand is most sudden in its operation, and is therefore best for the tenant who is only to take three or four crops; but the coarse or large grained sand is much better for the landlord, as the good it does lasts many years.

When the land has been well manured with the large sand, they take four crops of corn from it, and then lay it down for pasture for six or seven years before they plow it again. The grass is so good that they commonly mow it for hay the first year; it always abounds very much with the white flowered clover. If the grass grows but short, it is the farmer's interest to feed his cattle upon it, and it will turn to as good account this way, being very sweet and rich, and making the cattle fat, and the cows yield a very large quantity of milk.

SANDBACH, a market-town twenty-two miles eaft of Chefter.

SAND-BAGS, in the art of war, are bags filled with earth or fand, holding each about a cubic foot: their ufe is to raife parapets in hafte, or to repair what is beaten down.

SANDECK, a town of little Poland, thirty-five miles fouth-eaft of Cracow.

SAND-EEL, *ammodytes*, in ichthyology. See the article AMMODYTES.

SAND-FLOOD, a terrible mifchief, incident to the lands of Suffolk, and fome other parts of England; which are frequently covered with vaft quantities of fand, rolling in upon them like a deluge of water, from fandy hills in their neighbourhood.

The beft way of ftopping its progrefs is, by hedges or furze, planted one over another as they become level.

SAND-LANDS, or SANDY LANDS, in agriculture, are made up of fands of different colours and quantities; as white, blackifh, reddifh, or yellowifh; and in the fize of their particles, fome being milder or harfher, and others very light, feeming mere duft. The grey, black, and afh-coloured fands, are the worft of all, and are generally found on heaths and commons.

The moft fuitable plants for arable lands of this kind, are white oats, rye, black wheat, and turneps: the natural produce in weeds, is quick-grafs, forrel, broom, furze, fern, and heath. The beft manure for them is either marl, or fuch clay as will break with the frofts. Cow-dung is alfo faid to be good for fuch lands; and many ufe with fuccefs chalk, mud, and the half rotten ftraw of dunghills.

SANDAL, in antiquity, a rich kind of flipper, worn on the feet by the greek and roman ladies, made of gold, filk, or other precious ftuff, confifting of a fole, with an hollow at one extreme to embrace the ancle, but leaving the upper part of the foot bare.

Sandal, is alfo ufed for a fhoe or flipper worn by the pope, and other romifh prelates, when they officiate. It is alfo the name of a fort of flipper worn by feveral congregations of reformed monks. This laft confifts of no more than a mere leathern fole, faftened with latches or buckles, all the reft of the foot being left bare. The capuchins wear fandals, the recollects, clogs: the former are of leather, and the latter of wood.

SANDARACH, in natural hiftory, a very beautiful native foffil, though too often confounded with the common factitious red arfenic, and with the red matter formed by melting the common yellow orpiment.

It is a pure fubftance, of a very even and regular ftructure, is throughout of that colour which our dyers term an orange-fcarlet, and is confiderably tranfparent even in the thickeft pieces. But though with refpect to colour, it has the advantage of cinnabar while in the mafs, it is vaftly inferior to it when both are reduced to powders. It is moderately hard, and remarkably heavy, and when expofed to a moderate heat, melts and flows like oil: if fet on fire, it burns very brifkly.

It is found in Saxony and Bohemia, in the copper and filver mines, and is fold to the painters, who find it a very fine and valuable red: but its virtues or qualities in medicine, are no more afcertained at this time, than thofe of the yellow orpiment.

*Gum*-SANDARACH, is a dry and hard refin, ufually met with in loofe granules, of the bignefs of a pea, a horfe-bean, or larger; of a pale whitifh yellow, tranfparent, and of a refinous fmell, brittle, very inflammable, of an acrid and aromatic tafte, and diffufing a very pleafant fmell when burning. It is produced from a fpecies of the juniper, and the cedrus baccifera. See the article JUNIPER.

It flows only from thefe trees in hot countries; but the natives promote its difcharge by making incifions in the bark.

What is obtained from the cedar is more fragrant, efpecially when burnt; but it is feldom to be met with feparate in the fhops, both being mixed together under the common name of fandarach.

Sandarach is good in diarrhœas, and in hæmorrhages; where its dofe is from ten grains to half a dram: it is alfo fometimes prefcribed in gonorrhœas, and the fluor albus; but at prefent it is much difufed in medicine. It is, however, much ufed by our writing-mafters, who make a powder of it which they call pounce.

The varnifh-makers make a kind of varnifh of it by diffolving it in oil of turpentine, or linfeed, or in fpirit of wine. See the article VARNISH.

Gum-fandarach, on its being imported,

pays a duty of 5 s. 5 $\frac{10}{100}$ d. the 112 pounds, and on exportation draws back 4 s. 9 $\frac{12}{100}$ d.

SANDIVER, a whitiſh ſalt, continually caſt up from the metal, as it is called, whereof glaſs is made; and ſwimming on its ſurface, is ſkimmed off. See the article GLASS.

Sandiver is alſo plentifully thrown out in the eruptions of vulcanos; ſome is of a fine white, and others tinged bluiſh, or yellowiſh.

Sandiver is detergent, and good for foulneſſes of the ſkin. It is alſo uſed by gilders of iron. See GILDING.

SANDIX, a kind of minium, or red-lead, made of ceruſe; but much inferior to the true minium. See the articles MINIUM and CERUSE.

SANDOMIR, a city of little Poland, and capital of a Palatinate of the ſame name, eighty miles north-eaſt of Cracow.

SANDVLIET, a town of Brabant, ten miles north of Antwerp.

SAND-WALK. See the article WALK.

SANDWICH, one of the cinque-ports, in Kent, ten miles eaſt of Canterbury: it ſends two members to parliament, and gives the title of earl to the noble family of Montague.

SANE MEMORY, in law, denotes ſound and perfect memory to do any lawful act. See the articles MEMORY and COMPOS.

SANGUESSA, a town of Spain, twenty miles ſouth of Pampeluna: weſt long. 1° 30′, north lat. 42° 40′.

SANGUIFICATION, in the animal œconomy, the converſion of chyle into true blood. See the articles CHYLE, CHYLIFICATION and BLOOD.

SANGUINARIA, BLOOD-WORT, a genus of the polyandria-monogynia claſs of plants, the flower of which conſiſts of eight very patent petals; and the fruit is an oblong ventricoſe capſule, containing a great many roundiſh and acuminated ſeeds.

SANGUINE, in general, ſomething abounding with, or reſembling blood. See the article BLOOD.

Among heralds, the term ſanguine is often given to the colour more uſually called murrey; being made of red lake tinged with a little ſpaniſh brown; it is chiefly uſed in the coats of the knights of the bath, and is repreſented, in engraving, by hatches like thoſe of purpure. See the article PURPURE.

SANGUINE-STONE, *lapis hæmatites.* See the article HÆMATITES.

SANGUIS, BLOOD, in the animal œconomy. See the article BLOOD.

SANGUIS DRACONIS, *dragon's-blood,* in pharmacy. See DRAGON'S-BLOOD.

SANGUIS HIRCI, *goat's blood,* in pharmacy, the dried blood of a middle-aged goat, which is eſteemed in Germany as a ſudorific, and a great medicine in pleuriſies; but with us is little regarded.

SANGUISORBA, BURNET, in botany, a plant of the tetrandria-monogynia claſs, with a monopetalous flower, divided into four deep ſegments, cohering only at the ungues; the fruit is a ſmall bilocular capſule, containing very ſmall ſeeds.

The great burnet, ſanguiſorba major, is celebrated as a cordial, ſudorific, and aſtringent; but though great cures are ſaid to have been effected by it, the preſent practice neglects it.

SANGUISUGA, in zoology, a name given to the hirudo or leech. See the article LEECH.

SANHEDRIM, or SANHEDRIN, among the Jews, the great council of the nation, conſiſting of ſeventy ſenators, taken partly from among the prieſts and levites, and partly out of the inferior judges, who formed what was called the leſſer ſanhedrim. The room they met in, was a rotunda, half of which was built without the temple, and half within. The naſi, or preſident of the ſanhedrim, ſat upon a throne, with his deputy on his right hand, his ſub-deputy on his left, and the other ſenators ranged in order on each ſide.

The authority of this council was very extenſive, for they decided ſuch cauſes as were brought before them by way of appeal from the inferior courts; and the king, the high-prieſts, and prophets were under the juriſdiction of this tribunal. They had the right of judging in capital caſes, and ſentence of death might not be pronounced in any other place; for which reaſon the Jews were forced to quit this hall, when the power of life and death was taken out of their hands, forty years before the deſtruction of the temple, and three years before the death of Chriſt.

There were ſeveral inferior ſanhedrims in Paleſtine, each of which conſiſted of twenty-three perſons; all theſe depended on the great ſanhedrim of Jeruſalem.

SANICLE, *ſanicula,* in botany, a genus of

of the pentandria-digynia clafs of plants, with an umbelliferous flower; each partial one being compofed of five compreffed and bifid petals; the fruit is compofed of two feeds, plane on one fide, and convex and fcabrous on the other. See plate CCXXXVI. fig. 4.

The leaves of this plant have long been celebrated for their vulnerary qualities, both internally and externally; but are, neverthelefs, difregarded by the prefent practitioners.

SANIDIUM, in natural hiftory, the name of a genus of foffils, of the clafs of the felenitæ, but neither of the rhomboidal nor columnar kinds, nor any other way diftinguifhable by its external figure, being made up of feveral plain, flat plates. See the article SELENITÆ. The felenitæ of this genus are of no determinate form, nor confift of any regular number of planes or angles, but are merely flat, broad, and thin plates or tables, compofed of other yet thinner plates, like the talcs, but diftinguifhed from thofe bodies by this, that thefe plates are made up of arrangements of flender fibres, difpofed obliquely, but in uninterrupted lines acrofs the body. Of this genus there are only two known fpecies, the one colourlefs and pellucid, the other whitifh and opake. The firft is found pretty frequently about Oxford, as alfo in Northamptonfhire, Yorkfhire, and other counties; the other is very common in all parts of Germany, and is found alfo in Leicefterfhire, and fome other parts of England, but with us about London it is not common.

SANIES, in medicine, a ferous putrid matter, iffuing from wounds; it differs from pus, which is thicker and whiter.

SAN MATHEO, a town of Spain, in the province of Valencia, fifty-five miles north of the city of Valencia.

SANQUHAR, a borough town of Scotland, in the county of Nithfdale, twenty-one miles north of Dumfries.

SANTA CLARA, an ifland in the Pacific Ocean, fituated in the bay of Guyaquil: weft long. 80°, fouth lat. 3° 15′.

SANTA CRUZ, a port-town on the north fide of the ifland of Cuba, in North America: weft long. 85° 30′, north lat. 22° 30′.

SANTA FE, the capital of New Mexico: weft long. 109°, north lat. 36°.

SANTA FE DE BAGOTA, the capital of Terra Firma, in South America; weft long. 74°, north lat. 4° 30′.

SANTA MARIA, a town of Terra Firma, in the province of Darien, fituated on a river of the fame name, a little eaft of the bay of Panama: weft long. 80°, north lat. 7° 40′.

SANTALUM, SAUNDERS, in the materia medica, a hard, odoriferous medicinal wood, brought from the Eaft-Indies, of which there are three forts, *viz.* the yellow, white and red: the yellow, or citrine faunders, is a beautiful wood; of the colour of lemon-peel; of a fmell fomewhat like a mixture of mufk and rofes, and of a fomewhat acrid and aromatic tafte, with a flight bitternefs. The white faunders refembles the yellow, and is of the fame fragrant fmell and aromatic tafte, but in a more remifs degree. Both thefe forts fhould be chofen found, firm, heavy, and of a good fmell when cut; they fhould alfo be chofen in the block, and not cut into chips as they ufually are, for in this manner they foon lofe much of their virtue. The red faunders is of a denfe and compact texture, remarkably heavy and very hard. It is brought to us in logs of confiderable length, the out part of which is of a dufky, and the inner of a blood red; it has but little fmell, and is of an auftere tafte.

All thefe forts are attenuants, and all have an aftringency, but the red moft of all. They are accounted cordials, and are faid to be good in obftructions of the vifcera; but they are little ufed, except as ingredients in fome of the compofitions of the fhops.

Santalum is a plant of the octandria-monogynia clafs, with a monopetalous campanulated flower, and a berry for its fruit.

SANTAREN, a city of Portugal, in the province of Eftremadura, fituated on the river Tagus, fifty miles north-eaft of Lifbon.

SANTEN, a town of Germany, in the circle of Weftphalia and dutchy of Cleeve, fifteen miles fouth-eaft of the city of Cleeve, fubject to Pruffia.

SANTERRE, the fouthern divifion of Picardy, in France.

SANTILLANA, a city and port-town of Spain, the capital of the eaftern Afturia, fituated on the bay of Bifcay: weft long. 5°, and north lat. 43° 35′.

SANTOLINA, FEMALE SOUTHERN-WOOD, or LAVENDER-COTTON, a plant of the fyngenefia-polygamia clafs, the compound flower of which is uniform, confifting of a number of infundibuliform herma-

hermaphrodite corollulæ, quinquifid at the limb; which are each followed by a fingle feed, contained in the cup.

The medicinal virtues afcribed to fantolina, are, in general, the fame with thofe of the abrotanum mas, or male fouthernwood: it is however particularly recommended in uterine complaints; and its feed is good for deftroying worms. See the article SOUTHERN-WOOD.

SANTOLINOIDES, or ANACYCLUS, in botany, a plant nearly allied to the cotula, the compound flower of which is radiated; the difc being occupied by funnel-fhaped hermaphrodite corollulæ, quinquifid at the limb; and the female flowers are ligulated; there are five capillary and very fhort ftamina; and the feeds are fingle, after each partial flower.

SANTORINI, an ifland of the Archipelago, thirty-five miles in circumference: eaft long. 25° 35′, north lat. 36° 10′.

SAONE, a river of France, which rifes in Lorrain, and falls into the Rhone, at Lyons.

SAP, in phyfiology, a juice furnifhed by the earth, and changed into the plant, confifting of foffil parts, other parts derived from the air and rain, and others from putrified animals, plants, &c. See the article JUICE.

This juice enters the plant in form of a fine and fubtile water, which the nearer it is to the root, the more it retains of its proper nature; and the farther from the root, and the more action it has fuftained, the nearer it approaches to the nature of the vegetable: confequently, when the juice enters the root, it is earthy, watery, poor, acid, and fcarcely oleaginous at all. In the trunk and branches it is farther prepared, though it ftill continues acid, as we find by tapping a tree in the month of February. The fap being here carried to the germs or buds, is more concocted; and here having unfolded the leaves, thefe come to ferve as lungs for the circulation and farther preparation of the juice. By fuch means is the fap ftill farther altered and digefted, as it is farther in the petals or leaves of the flowers, which tranfmit the juice, now brought to a farther fubtility, to the ftamina; thefe communicate it to the farina, or duft, in the apices, which is, as it were, the male feed of the plant; where, having undergone a farther maturation, it is fhed into the piftil, which performs the office of an uterus or womb; and thus having acquired its laft perfection, it gives rife to a new fruit or plant. The fap having thus gone its ftage, from the root to the remote branches, and even the flower; and having, in every part of its progrefs, depofited fomething both for aliment and defence, what is redundant paffes out into the bark, the veffels of which are inofculated with thofe in which the fap mounts; and through which it defcends to the root, and thence to the earth again. And thus a circulation is effected. See the article CIRCULATION.

SAP, or SAPP, in the art of war, is the digging deep under the earth of the glacis, in order to open a covered paffage into the moat. It is only a deep trench, covered at top with boards, hurdles, earth, fand-bags, &c. and is ufually begun five or fix fathoms from the falliant angle of the glacis. See the articles FORTIFICATION and APPROACHES.

SAPHENA, in anatomy, a vein which arifing over the malleolus internus up along the leg and the inner-part of the thigh, difcharges itfelf near the groin into the crural vein. It is this vein they ufually open when they bleed in the foot for fuppreffions of the menfes. See the article PHLEBOTOMY.

SAPHETA, in architecture, is the board over the top of a window, placed parallel and oppofite to the window ftool at the bottom.

SAPIENTIAL, an epithet applied to certain books of fcripture, calculated for our inftruction and improvement in prudence or moral wifdom, thus called in contradiftinction to the hiftorical and prophetical books. See BIBLE, &c.

The fapiential books are Proverbs, Canticles, Ecclefiaftes, the Pfalms, and Job; though fome reckon this laft among the hiftorical books. See the articles HAGIOGRAPHA, CANTICLES, &c.

SAPIENTIÆ *dentes*, in anatomy, the two laft or inmoft of the dentes molares of the upper jaw, one on each fide, thus called becaufe they appear not till perfons are grown. See the article TOOTH.

SAPIENZA, an ifland and cape in the mediterranean fea, on the fouth-weft point of the Morea, eaft long. 21° 15′, north lat. 36° 45′.

SAPPHIC, in poetry, a kind of verfe much ufed by the Greeks and Latins, denominated from the inventrefs Sappho. The fapphic verfe confifts of five feet, whereof the firft, fourth and fifth are trochees,

trochees, the second a spondee, and the third a dactyl; as in.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| *Aure-* | *am quis* | *quis medi* | *ocri-* | *tatem* |
| *Dili-* | *git, tu-* | *tus caret* | *obso-* | *leti* |
| *Sordi-* | *bus te-* | *cti, caret* | *invi* | *denda.* |

and after every three sapphic verses, there is generally subjoined an adonic verse, as

*Sobrius aulâ.*

See the article ADONIC.

SAPINDUS, the SOAPBERRY-TREE, in botany, a plant of the octandria-digynia class, the flower of which consists of four oval petals; and the fruit of three capsules, each including a globose nut.

The berries of this tree are used for washing, instead of soap, whence the english name.

SAPO, SOAP. See the article SOAP.

SAPONARIA, SOAPWORT, in botany, a plant of the decandria-digynia class, the flower of which consists of five petals, with a plane limb; and its fruit an unilocular capsule, containing a number of small seeds.

The root of this plant is accounted aperient, corroborant, and sudorific; and even preferred by some to sassafras in these intentions. The leaves, agitated with water, raise a saponaceous froth, which has nearly the same effects with solutions of soap itself, in taking out spots from cloaths, whence the name.

SAPPHIRE, a pellucid gem, which, in its finest state, is extremely beautiful and valuable, and second only to the diamond in lustre, hardness, and price. Its proper colour is a pure blue; in the finest specimens it is of the deepest azure, and in others varies into paleness in shades of all degrees between that and a pure crystal brightness and water, without the least tinge of colour, but with a lustre much superior to the crystal. They are distinguished into four sorts, *viz.* the blue sapphire, the white sapphire, the water sapphire, and the milk sapphire.

The gem known to us by this name is extremely different from the sapphire of the antients, which was only a semi-opake stone, of a deep blue, veined with white, and spotted with small gold-coloured spangles, in the form of stars, and was only a more beautiful kind of the lapis lazuli: but our sapphire they have described under the name of beryllus aeroides, or the sky-blue beryl.

The finest sapphires in the world are brought from the kingdom of Pegu, in the East-Indies, where some are found perfectly colourless, and others of all the shades of blue; these are all found in the pebble-form. We have very fine sapphires also, partly pebble, partly crystal-shaped, from Bisnagar, Conanor, Calicut, and the island of Ceylon: these also are of all the shades of blue. And in Ceylon there are sometimes found a sort of bastard gems, of a mixed nature between the sapphire and ruby. The occidental are from Silesia, Bohemia, and many other parts of Europe; but though these are often very beautiful stones, they are greatly inferior, both in lustre and hardness, to the oriental.

The sapphire is said to have very great virtues as a cordial, sudorific, and alexipharmic; but we have no good testimony of any body's having ever found this by experiment.

For the manner of making counterfeit sapphires, see the article *Imitation or counterfeiting of* GEMS *in glass.*

SAPPHIRINE WATER, in the materia medica, also called blue eye-water, is thus prepared: pour a pint of lime-water, made strong and fresh, into a copper-vessel, add to it a dram of crude sal armoniac, and throw in some filings or small pieces of copper, and let it stand till it has acquired a beautiful colour.

This is used as an eye-water; as also to deterge old ulcers: and sometimes it is mixed with other things in injections in gonorrhoeas.

SAQUEM, a port-town situated on the Red-sea, in the province of Abex, in Africa: east long. 38° 30′, and north lat. 19°.

SAR, a river in Germany, which rises in Alsace, and falls into the Moselle, a little above Triers.

SARABAITES, a sort of monks among the antient christians, who did not resort to the wilderness as others did, but lived publicly in cities. Two or three of them usually dwelt together, but they had no rule or government; they however observed very strict fasts; wore loose sleeves, wide stockings, coarse cloaths, frequently sighed, and always bitterly inveighed against the clergy.

SARABAND, a musical composition in triple time, the motions of which are slow and serious.

Saraband is also a dance to the same measure, which usually terminates when the hand that beats rises; by which it is distinguished

tinguished from a courant, which ends when the hand that beats the time falls; and is otherwise much the same as the minuet.

The saraband is said to be originally derived from the Saracens, and is usually danced to the sound of the guitar or castanettes.

SARACENS, the inhabitants of Arabia; so called from the word *sara*, which signifies a desart, as the greatest part of Arabia is: and this being the country of Mahomet, his disciples were called Saracens.

SARAGOSSA, the capital of the province of Arragon in Spain: west long. 1° 15′, and north lat. 41° 32′.

SARCASM, in rhetoric, a keen bitter expression which has the true point of satyr, by which the orator scoffs and insults his enemy: such was that of the Jews to our Saviour, He saved others, himself he cannot save.

SARCOCELE, in surgery, a spurious rupture, or hernia, wherein the testicle is considerably tumified or indurated, like a scirrhus, or much enlarged by a fleshy excrescence, which is frequently attended with acute pains, and sometimes ulceration, so as to degenerate at last into a cancerous disposition. See HERNIA.

When the tumour of the testicle is accompanied with hardness, the causes are much the same with those of a scirrhus. When there is a fleshy excrescence, then the cause is usually some contusion or other external violence. The tumour differs as to its imagnitude, being frequently no larger than a hen's egg, tho' sometimes as big as a man's fist. The signs whereby the sarcocele may be distinguished from other ruptures are principally the hardness of the tumour, and its seat being in the testicle; whereas the true herniæ are distinct from the testicle, and softer to the touch. If a sarcocele be not timely brought to a suppuration, it very easily degenerates into a cancer; and if both testicles are affected, castration is often necessary; but if the tumour proceeds through the unguen, up to the abdomen, even castration will be useless, and death is the consequence.

A recent sarcocele, according to Heister, may frequently be suppurated by digestive medicines, as well internal as external. When these medicines prove ineffectual, the size and pain of the tumour increase, and it seems inclined towards a cancerous disposition, if it has not reached the ring of the abdominal muscles, there is then but one way left of relieving the patient, and that is by a dextrous and timely extirpation of the disordered testicle, or both if they are affected, which is termed castration, and renders the patient impotent.

In this operation the spermatic vessels are first to be tied securely, with a ligature near the inguen, and afterwards divided, to give the patient less pain; and as a division of these vessels, which are so much enlarged, may be attended with a fatal hæmorrhage, it may be prudent, for the greater security, to pass a double ligature round those vessels, one below the other; or else not to extirpate the testicle so soon as it is freed from the scrotum, and its vessels strictly tied, but to wait a few days, till the testicle begins to grow flaccid and mortifies, which is a sign the spermatic vessels are well secured, and may be divided without any danger; but if that does not follow, the ligature is not strict enough, and another must be made much tighter.

If a patient should be troubled with a fleshy excrescence upon his testicle, which is in other respects sound, and finds no relief from medicines, the testicle may be preserved, and yet the patient freed from his disorder, by opening the scrotum, and extirpating the offending part only.

With regard to the dressing, it is to be done with scraped lint and compresses, and secured by a proper bandage; and to abate the inflammation, which sometimes arises, a discutient cataplasm may be used, and the wound afterwards treated with some digestive ointment of vulnerary balsam. See WOUND.

SARCOCOLLA, in pharmacy, a gum-resin, which approaches greatly to the nature of the simple gums. See the articles GUM and RESIN.

It is brought to us from Persia and Arabia, in small granules, moderately heavy, and of a whitish, brownish, or reddish colour, very friable, of a faintish disagreeable smell, and of an acrid and nauseous taste.

Hoffman absolutely condemns the internal use of it. However it is recommended in ophthalmias, and defluxions of a sharp matter upon the eyes; and is generally ordered to be dissolved in milk for this purpose.

SARCOLOGY is that part of anatomy which treats of the soft parts, *viz.* the muscles, intestines, arteries, veins, nerves,

and fat. See MUSCLE, INTESTINES, &c.

SARCOMA, in furgery, denotes any flefhy excrefcence. See EXCRESCENCE.

Sarcomata of the nofe, eyes, &c. may be fometimes removed by cauftics; but the extirpating them with the knife or fciffars is the fafeft and moft eligible method. The wound fhould be fuffered to bleed a while, after which it may be wafhed with collyrium made of aloes, tutty, and fugar of lead, mixed in rofe-water.

SARCOPHAGOUS MEDICINES, in furgery, &c. are thofe which eat away proud flefh, and otherwife called cauftics. See the article CAUSTICS.

SARCOTICS, in furgery, medicines which generate flefh in wounds. See the articles WOUND and VULNERARY.

SARCULATION, in the antient agriculture, a kind of hoeing, ufed to root up the weeds in the peas, &c.

SARDA, the PILCHARD, in ichthyology. See the article PILCHARD.

SARDA, the CARNELIAN, in natural hiftory. See the article CARNELIAN.

SARDACHATES, a beautiful fpecies of agat, of a cloudy and fpotted flefh colour. See the article AGAT.

SARDAM, a port-town of Holland, fituated on the north-fide of the Wye, feven miles north-weft of Amfterdam.

SARDINIA, an ifland of the Mediterranean, fituated between 8° and 10° eaft long. and between 39° and 41° north lat. It is about one hundred and forty miles long, and fixty broad; and gives the title of king to the duke of Savoy, under whofe dominion it is.

SARDIS, the antient capital of Lydia, in Afia, now in ruins.

SARDONYX, in natural hiftory, a genus of femi-pellucid gems, of the onyx-ftructure, zoned or tabulated, and compofed of the matter of the onyx variegated with that of the red or yellow carnelian. See the articles CARNELIAN and ONYX.

Of this ftone there are feveral beautiful fpecies; as, 1. The thin zoned red fardonyx; or whitifh onyx with thin fnow-white and red zones. 2. The broad zoned red fardonyx; or horny onyx, with punctuated zones. 3. The horny onyx, with whitifh and yellow zones; and is properly the yellow fardonyx and the chryfolite onyx of the antients. 4. The orange-coloured fardonyx; or bluifh white onyx, with orange-coloured and whitifh zones.

SARFE, in ichthyology, a fpecies of cyprinus, with the iris of the eye and all the fins and tail red. See CYPRINUS.

This is a large fpecies, and fomewhat refembles the roach, but it is narrower in proportion to its length, being, when full grown, ten inches long, and no more than three in breadth in the largeft part.

SARGUS, in ichthyology, one of the fpecies of fparus, which have the teeth in the jaws broad. See the article SPARUS.

The fargus is the yellow fparus with a black annular mark at the tail.

SARK, a little ifland between Guernfey and Jerfey, fubject to Great Britain.

SAROTHRA, in botany, a genus of the pentandria-trigynia clafs of plants, the calyx of which is a fingle-leafed, erect, permanent, perianthium, divided into four linear acute fegments; the corolla confifts of five linear, fpear-fhaped, acute, deciduous petals, fomewhat longer than the cup; the fruit is an oblong, acute, coloured capfule, containing only one cell, with three valves; the feeds are numerous, very fmall, and kidney-fhaped.

SARPLAR *of wool*, the fame with a pocket or half a fack.

SARRACENA, in botany, a plant of the polyandria-monogynia clafs, with a rofaceous flower, confifting of five oval petals; the fruit is a roundifh capfule, containing a great many roundifh feeds.

SARRASIN, or SARRAZIN, in fortification, the fame with herfe. See the article HERSE.

SARRITION, in the antient hufbandry, the fame with what we call hoeing. See the article HOEING.

SARSAPARILLA, in pharmacy, the root of the rough fmilax of Peru, confifting of a great number of long ftrings hanging from one head: thefe long roots, the only parts made ufe of, are about the thicknefs of a goofe-quill, or thicker, flexible, and compofed of fibres running their whole length: they have a bitterifh but not ungrateful tafte, and no fmell: and as to their medicinal virtues, they are fudorific and attenuant, and fhould be given in decoction, or by way of diet-drink.

SARSINA, a town of Romania, in Italy, twenty-three miles fouth of Ravenna.

SARTORIUS, in anatomy, is both an abductor and elevator, ferving to move the legs upwards and forwards, determining them to crofs each other, as taylors fit with them, whence the name; it rifes from the internal part of the anterior and fuperior

superior spine of the ileum; and descending obliquely, is inserted into the upper and inner part of the tibia.

SARUM, or OLD SARUM, a borough-town of Wiltshire, situated a little north of Salisbury.

It sends two members to parliament.

SASSAFRAS, in pharmacy, the wood of an american tree, of the laurel-kind, imported in large straight blocks: it is said to be warm, aperient, and corroborant; and frequently employed, with good success, for purifying and sweetening the blood and juices; for which purpose an infusion, in the way of tea, is a very pleasant drink: its oil is very fragrant, and possesses most of the virtues of the wood.

It is an excellent diuretic and diaphoretic, and therefore good in obstructions of the viscera, cachexies, scorbutic complaints, and in the venereal disease.

SASSARI, a town of Sardinia, sixty-five miles north of Oristagni.

SAS VAN GHENT, a town of Dutch Flanders, twelve miles north of Ghent.

SATELLITE, in astronomy, the same with a secondary planet, or moon; so called from its continually waiting upon or revolving round one of the primary planets. See the article PLANET.

Thus the moon may be called the satellite of the earth: but the term is chiefly applied to the new-discovered planets, which make their revolution about saturn and jupiter. See the articles MOON, JUPITER, and SATURN.

SATIR, SATIRE, or SATYR. See SATYR.

SATISFACTION, in law, is the giving a recompence for some injury done; or the payment of money due on bond, judgment, &c.

SATRAPA, or SATRAPES, in persian antiquity, denotes an admiral; but more commonly the governor of a province.

SATTIN, a glossy kind of silk stuff, the warp of which is very fine, and stands out so as to cover the coarser woof.

Some sattins are quite plain, others wrought; some flowered with gold or silver, and others striped, &c.

The chinese sattins are most valued, because of their cleaning and bleaching easily, without losing any thing of their lustre: in other respects they are inferior to those of Europe.

SATTINET, a slight thin kind of sattin, commonly striped, and chiefly used by the ladies for summer night-gowns.

SATURANTS, in pharmacy, the same with absorbents. See ABSORBENTS.

SATURATION, in chemistry, is the impregnating an acid with an alkali, or *vice versa*, till either will receive no more, and the mixture will become neutral.

SATURDAY, the seventh or last day of the week, so called from the idol Seater, worshiped on this day by the antient Saxons, and thought to be the same as the Saturn of the Latins. Saturday answers to the jewish sabbath. See SABBATH.

SATUREIA, SAVORY, in botany, a genus of the didynamia-angiospermia class of plants, with a monopetalous ringent flower, and no pericarpium; the seeds, which are four and roundish, being contained in the bottom of the cup.

The leaves of summer-savory are very pungent, warm, and aromatic; and afford, in distillation with water, a subtile essential oil. Both are esteemed good in crudities of the stomach, asthmas, and mestrual obstructions.

SATURN, ♄, in astronomy, the remotest of the superior planets, which, by reason of its great distance from the sun, shines but with a feeble light. See PLANET.

Though Galileo's telescope was sufficient to discover all jupiter's moons, it could not reach saturn's, on account of their great distance; but yet this sagacious observer found saturn, by reason of his ring, had a very odd appearance; for his glass was not good enough to exhibit the true shape of a ring, but only a confused idea of that and saturn together, which, in the year 1610, he advertised in the letters of this sentence transposed; "Altissimum planetam tergeminum observavi;" *i. e.* I have observed saturn to have three bodies.

This odd phænomenon perplexed the astronomers very much, and various hypotheses were formed to solve it; all which appeared trifling to the happy Huygenius, who applied himself purposely to improve the grinding of glasses, and perfecting long telescopes, to arrive at a more accurate notion of this planet and its appendage. Accordingly, in 1655, he constructed a telescope of twelve feet; and viewing saturn divers times, he discovered something like a ring encompassing his body; which afterwards, with a tube of twenty-three feet, he observed more distinctly, and also discovered a satellite revolving about the planet. This huygenian satellite is the fourth in order from saturn. See plate CCXXXVI. fig. 5.

In the year 1659, Huygens published his discovery

discovery in relation to saturn's ring, in the letters of this sentence transposed. "Annulo cingitur tenui plano, nusquam "cohærente, ad eclipticam inclinato;" *i.e.* saturn is encompassed by a thin plane ring, no where cohering to his body, and inclined to the plane of the ecliptic. This inclination of the ring to the ecliptic is determined to be about 31 degrees by Huygens, Romer, Picard, Campani, *&c.* tho' by a method not very definitive. However, since the plane of the ring is inclined to the plane of the earth's motion, it is evident, when saturn is so situated that the plane of this ring passeth through the earth, we can then see nothing of it; nor can we see it when the plane passes between the sun and the earth, the dark side being then turned to us, and only a dark list appearing upon the planet, which is probably the shadow of the ring. In other situations the ring will appear elliptical, more or less; when it is most so, the heavens appear through the ecliptic space on each side saturn (which are called the ansæ), and a fixed star was once observed by Dr. Clarke's father in one of them.

The nodes of the ring are in 19° 45′ of virgo and pisces. During saturn's heliocentric motion from 19° 45′ to the opposite node, the sun enlightens the northern plane of the ring.

Since saturn describes about one degree in a month, the ring will be visible thro' a good telescope till within about fifteen or twenty days before and after the planet is in 19° 45′ of virgo or piscis. The time therefore may be found by an ephemeris, in which saturn, seen from the earth, shall be in those points of the ecliptic; and likewise when he will be seen from the earth in 19° 45′ of gemini and sagittarius, when the ring will be most open, and in the best position to be viewed.

There have been some grounds to conjecture that saturn's ring turns round an axis; but that is not yet demonstrable. This wonderful ring, in some situations, does also appear double; for Cassini, in 1675, observed it to be dissected quite round by a dark elliptical line, dividing it, as it were, in two rings, of which the inner one appeared brighter than the other. This was oftentimes observed afterwards, with tubes of thirty-four and twenty feet, and more evidently in the twilight or moon-light, than in a darker sky. This ring is the most remarkable thing in the whole planetary system, there being nothing of that nature hitherto discovered in any of the other planets. Kepler, in his Epitom. Astron. Copernic. and after him Dr. Halley, in his enquiry into the causes of variation of the needle, Philos. Transact. n° 195, suppose our earth may be composed of several crusts or shells, one within another, and concentric to each other. And if so, then it is possible the ring of saturn may be the fragment or remaining ruins of his formerly exterior shell, the rest of which is broken or fallen down upon the body of the planet. And if saturn ever had such a shell round it, its diameter would then have appeared as big to an eye at the sun, as that of jupiter doth now, when seen from thence.

Since the outward margin of the ring is distant from saturn 2¼ of saturn's semi-diameter, this cannot be seen at the distance of 64 degrees from saturn's equator, in whose plane the ring is placed. Therefore, a spectator, placed in a latitude higher than that, can never see the ring at all; so that there is a zone of almost 53 degrees broad towards either pole, to whom this famous ring can never appear. And as the spectator shall move nearer the pole, first one, then the second satellite, next the third and fourth, and, when he is come within one degree of the pole, even the fifth satellite cannot be seen, unless by refraction; and, in the winter-time, neither sun moon nor any planet will be there visible, unless perhaps a comet.

If the eye be supposed to be placed in the equator of saturn, or in the zone nearly adjoining, it can never see those stars that are in or very near the equator, nor any one of the satellites; because the ring will always hide them; and then at the equinoxes it cannot see the sun; and if it were any where else placed, it could not then see the ring; because neither of its faces will then appear illuminated by the sun.

The breadth of this ring it is hard to determine from our earth, because its thickness is so small; but Mr. Huygens makes it to be about 600 german miles.

For one half of saturn's year (*viz.* fifteen of ours) only one face of the ring will be enlightened by the sun; whence the inhabitants, which may be supposed to live in that hemisphere to which this face of the ring is turned, or to whom it is summer, will see that part of the ring which is above their horizon, shining faintly by day, as our moon doth when the

the ſun is above our horizon, but brighter and ſtronger by night, as our moon doth in the ſun's abſence: and, after ſun-ſet, the eaſtern part of this enlightened arch will fall within the ſhadow of ſaturn; which ſhade will aſcend, as night comes on, and at night will be at the higheſt; and then will deſcend again towards the weſtern part of the ring, according as the ſun comes more and more to the eaſtward.

This enlightened arch will always ſhew how to deſcribe a meridian line; for a plane perpendicular to the horizon, and paſſing through the vertex of the arch, will be in the true meridian.

To an eye placed any where without, and at leſs than fifty degrees diſtant from the equator, this enlightened arch of the ring will appear concave as well as convex, like a kind of furnace or vault, riſing above the horizon: but to an eye more than 52 minutes, and leſs than 64 degrees, diſtant from the equator, the hollow or concave part will not be viſible; but there will appear a brightiſh body ariſing, as it were out of the ground, and contiguous to the horizon.

For the other half of ſaturn's year, while the ſun declines towards the depreſſed pole, or during the fifteen years winter, the ring will not be viſible, as having not that face illuminated which is turned to the ſpectator's eye; but, however, will render itſelf ſenſible, by covering from the ſight ſuch ſtars and parts of the heavens as are oppoſite to it, or apparently behind it. The ſhade of the ring alſo will be extended more and more towards the nearer pole; ſo that to an eye placed any where within the aforeſaid ſpace, the ſun, when he attains ſuch a certain declination, will appear to be covered or eclipſed juſt at noon, and then ſtraight to emerge out of the ſhadow. The next day, the like phenomenon will happen, but the eclipſe will begin ſooner, and will be over later: and theſe meridian eclipſes will daily increaſe in their duration until the middle of winter; and then they will decreaſe again gradually, till at laſt they will come to nothing again, *viz.* when the ſun, returning from the tropic, hath the ſame declination as he had when theſe meridional eclipſes began.

And this will happen, if an eye be placed in any latitude greater than 25 or 26 degrees; but if in a latitude leſs than this, when the meridional darkneſs is of the greateſt duration, the ſun will ſuddenly appear juſt in the meridian, and then ſtraightway will be eclipſed again. The next day there will appear the like ſort of light, but it will laſt longer; and this meridian light will grow ſtill longer and longer in duration, till mid-winter, and then, like the darkneſs above-mentioned, it will be continually decreaſing, until it quite diſappear.

And from hence it is plain, that there is the greateſt difference between ſummer and winter in the globe of ſaturn, of all the other planets; and this both on the account of the long duration of each, and the great declination of the ſun from the equator; and alſo by reaſon of theſe meridional darkneſſes of the winter, ariſing from the ring's eclipſing the ſun.

If an eye were placed in ſaturn, the diameter of the ſun would appear almoſt ten times leſs than it doth to us; and conſequently his diſc, light, and heat will be there ninety times leſs. Saturn's year is almoſt thirty of ours; but the length of his day is yet uncertain, becauſe the time of his revolution round his axis is not yet known; but Mr. Huygens judges they are longer than the days of jupiter. That great aſtronomer ſuppoſeth the axis of ſaturn to be perpendicular to the plane of his ring, and of the orbits of the ſatellites: if ſo, then there will be the ſame poſition of the equator and poles, as to the fixed ſtars, as there is in our earth; the ſame pole-ſtar and the fixed ſtars will appear to riſe and ſet after the ſame manner, in the ſame latitudes. There is a vaſt inequality, in the length of the day, in ſeveral parts of this planet; and as great a diverſity of ſummer and winter; which depends on the quantity of the inclination of the plane of the quator to the plane of the orbit of ſaturn round the ſun, which Huygens makes to be 31 degrees, which is almoſt one third more than our earth, where yet the differences and variety of ſeaſons and weather are very ſenſible. For in ſaturn, in the latitude of 50 degrees, the longeſt day will have no night at all, and the longeſt night will have no day. And the two frigid zones will be each of them 62 degrees broad, at leaſt ten times as large as the whole ſurface of our earth. The eye thus placed will be able to diſcern none of the planets but jupiter, which will appear always to accompany the ſun, and never to be from him above 37 degrees. The parallax of the ſun in ſaturn is but

nine feconds, and therefore infenfible; but the parallaxes of all his moons or fatellites are very confiderable, and therefore their diftances from him will be eafily computable.

For the other particulars relating to the aftronomy of faturn, fee PLANET, COPERNICAN, DIAMETER, DISTANCE, INCLINATION, PERIOD, &c.

*Satellites of* SATURN, are five moons; the firft or inmoft of which revolves about faturn in 1 day, 21 hours, and 18 minutes, at the diftance of near two femi-diameters of the ring; the fecond in 2 days, 17 hours, and 41 minutes, at the diftance of 2 $\frac{1}{2}$ femi-diameters; the third, in 4 days, 12 hours, and 25 minutes, at the diftance of 3 $\frac{1}{2}$ femi-diameters; the fourth, in 15 days, 22 hours, and 41 minutes, at the diftance of 8 femi-diameters; and the fifth, in 70 days, 22 hours, and 4 minutes, at the diftance of 23 $\frac{3}{10}$ femi-diameters of faturn's ring.

In the beginning of the year 1665, the celebrated Mr. Huygens, as already obferved, difcovered the biggeft of faturn's fatellites; the other four fatellites of faturn were all the difcovery of Mr. Caffini, the third and fifth in the years 1671, 1672, and 1673; but the firft and fecond were not difcovered till the year 1684, by extraordinary telefcopes of eighty, one hundred, one hundred and fifty, and two hundred feet in length.

SATURN, in chemiftry, &c. an appellation given to lead. See LEAD.

SATURN, in heraldry, denotes the black colour, in blazoning the arms of fovereign princes. See the articles SABLE, COLOUR, and BLAZONING.

SATURNALIA, in roman antiquity, a feftival obferved about the middle of December, in honour of the god Saturn, whom Lucan introduces, giving an account of the ceremonies obferved on this occafion thus: "During my whole reign, which lafts but for one week, no public bufinefs is done; there is nothing but drinking, finging, playing, creating imaginary kings, placing fervants with their mafters at table, &c. There fhall be no difputes, reproaches, &c. but the rich and poor, mafters and flaves, fhall be equal," &c.

On this feftival the Romans facrificed bare-headed, contrary to their cuftom at other facrifices.

SATURNINE, an appellation given to perfons of a melancholy difpofition, as being fuppofed under the influence of the planet faturn. See MELANCHOLY.

SATYR, in the heathen mythology, a fabulous kind of demi-god, or rural deity, of the antient Romans, reprefented with goat's feet, and fharp pricked up ears. Some think the notion of thefe fatyrs might have been derived from the monkeys known at prefent under the fame name. See the article MONKEY.

SATYR, or SATIRE, in matters of literature, a difcourfe or poem, expofing the vices and follies of mankind.

The fatyr of the Greeks differed from that of the Romans, as being a kind of interlude annexed to tragedy, with a view to remove from the audience too melancholy impreffions. But fatyr, as we now have it, is entirely roman, if we may believe Quintilian, who fays, "*Satira quidem tota noftra eft*;" or Horace, who ftyles Ennius the inventor of a poem, unknown to the Grecians, meaning fatyr, according to the opinion of all his interpreters. Scaliger however exprefly denies it to be of roman original; and there is reafon, indeed, as we fhall fee hereafter, to underftand thefe expreffions of Quintilian and Horace with fome abatement. Thofe that will not allow it to be derived from the Grecians, but entirely roman, maintain that fatyr fhould be writ with an *i*, not a *y*; and that it is not derived from *fatyrus*, but *fatur*; *fatira* therefore is the fame as *fatura*, as *maximus* antiently *maxumus*.

When the Romans grew more polite, thefe kind of verfes refined in proportion, but they ftill retained their jibes and banters, and kept fo far to their firft inftitution, as to make the follies of human life the object of their ridicule. From hence proceeded fatyr, fo called from the farrago and variety of matter it contained. It was improved likewife with mufic and dancing, which, confidering its being carried on in dialogue, made it refemble fomewhat of the dramatic kind; nor had the Romans any thing that came fo near the drama as this did. Afterwards when they had received both tragedy and comedy from the Grecians, they were fo taken with the novelty, that fatyr for fome time lay neglected: but coming again into efteem, it was added as a kind of exodium to comedy. Thus things went on for fome years till Ennius arofe, endued with wit and true poetic fire, who obferving

obferving how fond the people were of feeing the vices of mankind expofed upon the ftage, thought a poem on the faid fubject, without the decoration of fcenes and action, might have the fame effect. Accordingly he attempted fatyrs in the fame form we now fee them, only he did not confine himfelf to the hexameter, but made ufe of all forts of meafure. The remains we have of this poet are noble indications of the ftrength of his genius; and Horace and Virgil have fhewn what opinion they had of his writings, by borrowing fo much from them. After Ennius fucceeded Pacuvius; but his works are all loft, excepting fome fragments, and thofe of uncertain authority. Next came Lucilius, of whom alfo we have fome fragments remaining: but his excellencies and imperfections are very amply fet forth by Horace, whofe words we have no occafion to cite here.

It muft be allowed however, that one fpecies of fatyr owes its perfection to Horace, as another does to Juvenal. A third kind was the varronian or menippean fatyr, fo called from Menippus, a cynic philofopher among the Grecians, whofe doctrine Varro followed. It was a fort of medley, confifting of not only all kinds of verfe, but of verfe and profe mixed together; a fpecimen of which we have in Petronius's Satyricon. We have none of Varro's poetical works remaining, except fome fmall fragments; which is the more to be lamented, confidering the character Quintilian gives of him, that he was the moft learned of all the Romans.

The word fatyr was antiently taken in a lefs reftrained fenfe than it is at prefent, not only as denoting a fevere poem againft vice, but as confifting of precepts of virtue, and the praifes of it: and even in the fatyrs, as they are called, of Horace, Juvenal, and Perfius, &c. which are principally levelled againft the weaknefs, the follies, or vices of mankind, we find many directions, as well as incitements, to virtue. Such ftrokes of morality Horace is full of; and in Juvenal they occur very frequently. All of them, fometimes, correct vice like moralifts; we may fay, like divines rather than fatyrifts. With refpect to the nature and different fpecies of it, fatyr, in general being a poem defigned to reprove the follies and vices of mankind, is twofold; either the jocofe, as that of Horace; or the ferious, like that of Juvenal; the former hidden, the latter open: that generally makes fport with vice, and expofes it to ridicule; this probes is to the bottom, and puts it to the torture: and fo far is it from not deferving the title of fatyr, as fome pretend, that it feems rather a more noble fpecies of it; and the genteel ftrokes of Horace, how ingenious foever, are lefs affecting than the poetic rage and commendable zeal of Juvenal.

They both agree in being pungent and cutting, yet are diftinguifhed by very evident marks. The one is pleafant and facetious, the other angry and auftere: the one fmiles; the other ftorms: the foibles of mankind are the object of one; greater crimes of the other: the former is always in the pleafing ftyle; the latter generally in the fublime: that abounds with wit only; this adds to the falt bitternefs and acrimony. Either kind of fatyr may be writ in the dialogue or epiftolary manner; and we have inftances of both forms in Horace, Juvenal, and Perfius. As fome of Horace's, which are called fatyrs, are as truly epiftles; fo many of his epiftles might as well be called fatyrs: for example, *Qui fit Mecænas, &c.* might, with equal reafon, be reckoned among the epiftles; and *Prima dicte mihi, &c.* among the difcourfes or fatyrs; if the author or editor had fo thought fit.

The chief fatyrifts among the antients are Horace, Juvenal, and Perfius; thofe among the moderns, Regnier, and Boileau, in French; and Dryden, Oldham, Rochefter, Buckingham, Pope, Young, &c. among the Englifh.

SATYRIUM, GOAT'S STONES, a genus of the gynandria-diandria clafs of plants, the flower of which confifts of five ovato-oblong petals; and its fruit is an oblong, unilocular capfule, containing a great many fcobiform and very fmall feeds.

The root of this plant is compofed of two oval bulbs, of a whitifh colour, a fweetifh tafte, and a faint unpleafant fmell: it abounds with a glutinous flimy juice; and, like other mucilaginous vegetables, it ferves to thicken the thin ferous humours, and defend the folids from their acrimony: it has alfo been celebrated, though on no very good foundation, for analeptic and aphrodifiac virtues; in which intentions it has alfo been frequently ufed.

SAVANNA, a town and river of Georgia, in North-America: weſt longitude 81° 20′, north latitude 32°.

SAVANT, or SCAVANT. See SCAVANT.

SAUCISSE, or SAUSAGE, in the military art, a long train of powder, ſewed up in a roll of pitched cloth, about two inches in diameter, ſerving to ſet fire to mines. See the article MINE.

There are uſually two ſauciſſes extended from the chamber of the mine to the place where the engineer ſtands; that in caſe one ſhould fail, the other may take effect.

SAUCISSON, in fortification, a maſs of large branches of trees bound together; and differing only from a faſcine, as this is compoſed of ſmall branches of twigs. See the article FASCINES.

Sauciſſons are employed to cover the men, and to make epaulements.

SAVE, a large river of Germany, which riſing in Carinthia, runs eaſt through Carniola and Croatia, and dividing Sclavonia from Turky, diſcharges itſelf into the Danube at Belgrade.

SAVIGLIANO, a town of Piedmont, twenty-one miles ſouth of Turin.

SAVIN, *ſabina,* in botany, is only a ſpecies of juniper. See the article JUNIPER.

Savin is famous as an hyſteric and attenuant: and, indeed, it promotes the diſcharges by urine, and the menſes, more forcibly than ſafely, if not under very careful management.

SAVIOUR, an appellation peculiarly given to Jeſus Chriſt, as being the true Meſſiah, and Saviour of the world. See the article MESSIAH.

*Order of St.* SAVIOUR, a religious order in the romiſh church, founded by St. Bridget, about the year 1345; and ſo called from its being pretended that our Saviour himſelf dictated to the foundreſs its conſtitutions and rules.

According to the conſtitutions, this order is principally founded for religious women who pay a particular honour to the holy virgin: but there are ſome monks of the order, to adminiſter the ſacraments, and ſpiritual aſſiſtance to the nuns. The number of nuns is fixed at ſixty in each monaſtery; and that of the religious prieſts at thirteen, according to the number of the apoſtles, of whom St. Paul was the thirteenth. There are alſo four deacons, repreſenting the four doctors of the church, St. Ambroſe, St. Auguſtin, St. Gregory, and St. Jerom; and eight lay-brothers; who altogether make up the number of the thirteen apoſtles, and the ſeventy-two diſciples of Jeſus Chriſt. The nuns are not admitted till eighteen years of age, nor the friars before twenty-five; and they are to perform a year's novitiate.

SAUMUR, a city of France, in the province of Orleanois, and dutchy of Anjou; twenty-four miles eaſt of Anjou.

SAUNDERS, the ſame with ſantalum. See the article SANTALUM.

SAVOLAXIA, a ſubdiviſion of Finland, in Ruſſia, ſituated between Cajania, Kexholm, Carelia, and Bothnia.

SAVONA, a city and port-town of the territory of Genoa, ſituated twenty-ſix miles ſouth-weſt of the city of Genoa.

SAVORY, *ſatureia,* in botany, *&c.* See the article SATUREIA.

SAVOUR, or TASTE. See TASTE.

SAVOY, a dutchy, ſituated between France and Italy, on the weſt ſide of the Alps; bounded by the lake and territory of Geneva, on the north; by Switzerland and Piedmont, on the eaſt; by another part of Piedmond and Dauphine, on the ſouth; and by Franche Compte and Dauphine, on the weſt.

SAURURUS, in botany, a plant of the hexandria trigynia claſs, without any flower petals: its fruit is an oval unilocular berry, containing only a ſingle oval ſeed.

SAUSAGE, or SAUCIDGE, a popular food, prepared of ſome crude meat, uſually either pork or veal chopped ſmall, ſeaſoned, and put up in a ſkin or gut in the manner of a black-pudding.

The moſt eſteemed confection of this kind is the bologna ſauſage, which is much thicker than the common ſort, and is made of freſh pork well beaten in a mortar, with a quantity of garlic, pepper in the grain, and other ſpices. Theſe ſauſages are made with moſt ſucceſs in ſome cities of Italy, particularly in Bologna, Venice, *&c.* whence great quantities are exported to other places: the Italians are furniſhed with great part of their ſkins or guts for theſe ſauſages from England.

Bologna ſauſages, on being imported into England, pay a duty of $2\frac{87\frac{1}{2}}{100}$d. the pound; and draw back, on exportation, $2\frac{58\frac{3}{4}}{100}$d.

SAUSAGE, in war, the ſame with ſauciſſe. See the article SAUCISSE.

SAULT,

SAULT, in the manege. See SALT.

SAUVAGESIA, in botany, a genus of the polyandria-monogynia claſs of plants, the corolla whereof conſiſts of five obtuſe equal petals, ſhorter than the leaves of the cup: the fruit is an oval acuminated capſule, covered by the cup, containing one cell, and in it a number of ſeeds.

SAW, an inſtrument which ſerves to cut into pieces ſeveral ſolid matters; as wood, ſtone, ivory, &c.

The beſt ſaws are of tempered ſteel ground bright and ſmooth: thoſe of iron are only hammer-hardened: hence, the firſt, beſides their being ſtiffer, are likewiſe found ſmoother than the laſt. They are known to be well hammered by the ſtiff bending of the blade; and to be well and evenly ground, by their bending equally in a bow.

The edge in which are the teeth is always thicker than the back, becauſe the back is to follow the edge. The teeth are cut and ſharpened with a triangular file, the blade of the ſaw being firſt fixed in a whetting-block. After they have been filed the teeth are ſet, that is, turned out of the right line, that they may make the kerf or fiſſure the wider, that the back may follow the better. The teeth are always ſet ranker for coarſe cheap ſtuff than for hard and fine, becauſe the ranker the teeth are ſet the more ſtuff is loſt in the kerf. The ſaws by which marble and other ſtones are cut have no teeth: theſe are generally very large, and are ſtretched out and held even by a frame.

The workmen who make the greateſt uſe of the ſaw, are the ſawyers, carpenters, joiners, cabinet-makers, eboniſts, ſtone-cutters, carvers, ſculptors, &c. The lapidaries too have their ſaw, as well as the workers in moſaic; but theſe bear little reſemblance to the common ſaw. But of all mechanics, none have ſo many ſaws as the joiners; the chief are as follows: the pit-ſaw, which is a large two handed ſaw, uſed to ſaw timber in pits; this is chiefly uſed by the ſawyers. The whip-ſaw, which is alſo two handed, uſed in ſawing ſuch large pieces of ſtuff as the hand-ſaw will not eaſily reach. The hand ſaw, which is made for a ſingle man's uſe, of which there are various kinds; as the bow or frame ſaw, which is furniſhed with cheeks: by the twiſted cords which paſs from the upper parts of theſe cheeks, and the tongue in the middle of them, the upper ends are drawn cloſer together, and the lower ſet further apart. The tenon-ſaw, which being very thin, has a back to keep it from bending. The compaſs-ſaw, which is very ſmall, and its teeth uſually not ſet: its uſe is to cut a round, or any other compaſs-kerf: hence the edge is made broad and the back thin, that it may have a compaſs to turn in. See moſt of theſe ſaws repreſented in the plate of JOINERY.

The ſurgeons alſo uſe a ſaw to cut off bones; this ſhould be very ſmall and light, in order to be managed with the greater eaſe and freedom, the blade exceeding fine, and the teeth exquiſitely ſharpened, to make its way more gently, and yet with great expedition, in cutting off legs, arms, &c. See pl. CCXXXVI. fig. 7.

Saws, on being imported, pay the following duties, *viz.* whip-ſaws, each $11\frac{55}{100}$ d. draw back, on exportation, $10\frac{12\frac{1}{2}}{100}$ d. Hand ſaws, the dozen, 1 s. $3\frac{40}{100}$ d. draw back, on exportaton, 1 s. $1\frac{1}{2}$d. Tenon-ſaws, the dozen, 2 s. $6\frac{80}{100}$d. draw back, on exportation, 2 s. 3 d. beſides the uſual duties on iron.

SAW-FISH, *ſerea piſcis*, or *priſtis*, in ichthyology, a ſpecies of ſqualus, with the roſtrum very long, flat, and dentated on both ſides. It is one of the moſt ſingular animals of the fiſh-kind, and grows to a conſiderable ſize, being often more than twelve feet in length, including the roſtrum, and very thick in proportion: the head is large, and terminates in a bony roſtrum, three or four feet, or more, in length, and furniſhed all along, on both ſides, with very long, robuſt, and ſharp teeth, or denticulations. See plate CCXXXVI. fig. 8.

SAWING, dividing timber, &c. by the application of a ſaw, either by the hand or mill.

The mechaniſm of a ſawing-mill may be reduced to three principal things, the firſt, that the ſaw be drawn up and down as long as is neceſſary, by a motion communicated by water to the wheel: the ſecond, that the piece of timber to be cut into boards be advanced by an uniform motion to receive the ſtrokes of the ſaw; for here the wood is to meet the ſaw; and not the ſaw to follow the wood, therefore the motion of the wood and that of the ſaw ought immediately to depend the one on the other: the third, that

that when the ſaw has cut through the whole length of the piece, the whole machine ſtops of itſelf and remains immoveable; for fear, leſt having no obſtacle to ſurmount, the force of the water ſhould turn the wheel with too great rapidity, and break ſome part of the machine. In plate CCXXXVII. and CCXXXVIII. we have given ſeveral views of this mill: plate CCXXXVII. fig. 1. repreſents a ſection of it taken lengthwiſe from A to B. Fig. 2. *ibid.* is a plan of the mill on a level with the ground: A B being the floor, and *ff*, *gg*, two grooves for receiving the ſhafts of the chariot, which carries the piece to be ſawed; by which means the piece not only advances with the chariot, but is alſo kept ſteady, ſo that the ſtrokes of the ſaw work always on the ſame line.

Fig. 1. pl. CCXXXVIII. repreſents the breadth of the mill: and fig. 2. *ibid.* the plan of the cave of the mill. In each of theſe figures the ſame letters expreſs the ſame parts, only repreſented in a different view: thus M N, in fig. 1. and 2. *ibid.* repreſent the great wheel turned by a fall of the water, which has five feet and a quarter of radius, and its arbor is ſixteen inches. O, in each of the figures, is the cog-wheel turning on the ſame arbor with the great wheel, and inſerting its teeth into the ſpindles of the trundle-head P; and, on the other, into thoſe of the trundle-head R: in the trundle-head P there is a broad handle faſtened to the iron-blade Y, (pl. CCXXXVII. fig. 1. which, as the trundle-head moves round, goes up and down, and gives the ſame motion to the ſaw T: this handle is ſeen in its true form at Q, (plate CCXXXVIII. fig. 1. and 2.) The other trundle-head, R, which turns with its axle-tree, or roller, S, (*ibid.* fig. 2.) winds up a rope, which brings towards the ſaw, the chariot *r*, (plate CCXXXVII. fig. 1.) on which the piece of wood to be ſawed is placed. When the wood is arrived cloſe to the ſaw the rope is no longer of uſe; there being then another moderator which regulates the motion of the piece in proportion as it is ſawed. Z, (pl. CCXXXVIII. fig. 1. is a cramp-wheel, containing three hundred and eighty-four hooked teeth, the axis of which wheel drives two ſmall trundle-heads, which are inſerted into teeth which line the undermoſt part of the ſhafts of the chariot; by which means, if the cramp-wheel advances, the chariot muſt alſo advance, and the piece of timber with it.

Upon the upper part of the entortiſe of the ſaw, (pl. CCXXXVII. fig. 1.) there is an iron-rod, *b*, faſtened to it, on the one end with a hinge, and on the ſide to a moving lever, *d*, which goes up and down with it; this lever is faſtened by a hinge at *a*: from the end of this lever there deſcends a wooden ſhaft, which carries at its extremity an iron in the form of a hind's foot, which enters the teeth of the cramp-wheel. In order to underſtand the uſe of all theſe parts, let it be obſerved, that after the rope, by being wound on the axis of the trundle-head R, has brought the chariot and piece of wood as far as the ſaw, the trundle-head P is let looſe to the cog-wheel, which makes the handle Q, and conſequently the ſaw, go up; which aſcending lifts up the lever *d*, which drawing the hinge at *a* the handle protracts itſelf, and drives farther a notch of the cramp-wheel Z: this cramp-wheel, in turning with its axis, drives round the trundle-heads, which inſerting their ſpindle into the teeth at the bottom of the chariot, carry off ſome of them, and make the piece of timber come a little forwards. This is all performed while the ſaw aſcends: and as it is larger at the top than at the bottom, it leaves at that inſtant an empty ſpace between itſelf and the piece of wood it has bit. The wood advances without any obſtacle, and receives a new ſtroke in the fall of the ſaw, which works only in going down; the wheel Z is at that time without any motion, and therefore communicates none to the chariot. It is during that reſt of the piece of wood that the ſtroke of the ſaw is given; and as the ſaw is broader at the top than at the bottom, it leans on the length of the wood, which is an ingenious imitation of the ſawyers, who bring the ſaw down obliquely, becauſe the fibres of wood are not eaſily cut when the ſtroke is tranſverſal: and as the arms of the ſaw move backwards and forwards occaſionally, to give the ſaw a proper inclination on the fibres of the wood; thus the upper iron rod, and the iron at the bottom of the ſaw obey the motion of the lever and handle, ſo as to form with the ſaw the inflexions neceſſary. This motion is continued, and the timber is ſtill brought under the ſaw, till a band of iron faſtened to the extremity of the piece of wood, meets with a trigger which draws out a

pin

pin applied to the ſluice to keep it up: when the ſluice falls the water ſtops, and the whole machine is without motion.

Sawing-mills are much uſed abroad, and were lately begun to be introduced in England; but the parliament taking it into conſideration that they would ſpoil the ſawyer's trade, and ruin great number of families, thought fit to ſuppreſs them.

Stones, &c. are alſo ſawed by an engine, the principal parts of which are repreſented in plate CCXXXIX. fig. 1. n° 1. where ILLI, is a ſquare frame perpendicular to the horizon, moving in the direction LL, in gutters made in the fixed beams AM, CB, and running upon little wheels. IL are two rods of iron, and *op* two hands of iron running along thoſe rods; to theſe are fixed the ſaws S, S. HIK is a triangle fixed to the axis of a great wheel. As the wheel and triangle go about from H towards I, the point I acting againſt the piece G, moves the frame towards MB, together with the ſaws S, S. When I is gone off, the angle K acts againſt the piece F, and moves the frame back again. Then H, acting againſt G, moves it forward; and ſo the ſaws are moved backward and forwards, as long as the wheel turns round. As theſe ſaws work by the motion of the engine the hands *op* deſcend. The parts F and G ought to be made curved; and little wheels may be applied at the points of the triangle to take away the friction againſt F and G: and if the power be ſtrong enough, the axle of the wheel may be made to carry more triangles, and work more ſaws. Inſtead of the triangle HIK, the frame may be moved by the two pieces, *ab*, *cd*, (*ibid.* n° 2.) going thro' the axis acroſs one another, ſo that *ab* may only act on F, and *cd* on G; F being only in the plane of *ab*'s motion, and G in that of *cd*.

SAXENHAGEN, a town of Weſtphalia, in Germany, twenty miles north-weſt of Hanover.

SAXIFRAGA, SAXIFRAGE, in botany, a genus of the decandria-digynia claſs of plants, with a roſaceous flower, conſiſting of five plane ovated petals: the fruit is an unilocular capſule, of an oval form, containing a great many ſeeds. See plate CCXXXVI. fig. 6.

The tuberoſities at the root of the white-flowered ſaxifrage are kept in the ſhops, under the name of ſaxifrage-ſeeds: they are diuretic and attenuant; and therefore good in nephritic caſes and obſtructions of the menſes and viſcera: ſome alſo recommend them in the jaundice and dropſy.

As to the ſaxifrage of the antients, it is not known what plant they meant by it; ſo that no benefit can be reaped from their accounts of its virtues.

It is alſo to be obſerved, that though many different plants have been called ſaxifrage, from their ſuppoſed power of diſſolving the ſtone in the human bladder, yet it is very certain that none of them poſſeſs ſuch a virtue: thus the filipendula has been called red-ſaxifrage, and the common melilot, yellow-ſaxifrage. See FILIPENDULA, &c.

SAXMUNDHAM, a market-town of Suffolk, thirty-two miles eaſt of Bury.

SAXON, or SAXON-LANGUAGE. See the articles LANGUAGE and ENGLISH.

SAXONY, the name of two circles of the german empire, diſtinguiſhed by the epithets upper and lower. The circle of Upper-Saxony comprehends the dutchy of Saxony, the marquiſates of Miſnia, Luſatia, and Brandenburg, and the dutchies of Pomerania, Sax-Hall, Sax-Altemburg, Sax-Merſburg, and Sax-Naumburg. The circle of Lower-Saxony comprehends the dutchies of Mecklenburg, Holſtein, Lawenburg, Lunenburg, Zell, Bremen, Brunſwic, Hanover, and Magdeburg; the principalities of Verden and Halberſtat, and the biſhopric of Hildeſheim.

SAY or SAYE, in commerce, a kind of ſerge, or woollen-ſtuff, much uſed abroad for linings, and by the religious for ſhirts: with us it is uſed for aprons by ſeveral ſorts of artificers, being uſually dyed green.

Double ſays, or ſerge, pay, on importation, a duty of 5 s. $3\frac{72}{100}$d. the yard, and draw back, on exportation, 2 s. $\frac{30}{100}$d. Double Flanders ſays pay, by the piece of fifteen yards, on importation, 1 l. 14 s. $7\frac{80}{100}$d. and draw back, on exportation, 1 l. 10 s. $4\frac{50}{100}$d. Hounſcot ſays, and milled ſays, pay, by the piece of twenty-four yards, on importation, 1 l. 3 s. $1\frac{20}{100}$d. and draw back, on exportation, 1 l. 3 d.

SAYBROOK, a port town of New-England, in the province of Connecticut, ſituated at the mouth of the river of Connecticut: in weſt longitude 72°, north latitude 41°.

SCAB, or ITCH, in medicine and surgery. See the article ITCH.

SCABBARD, in the manege, denotes the skin that serves as a sheath, or cover, to a horse's yard.

SCABELLUM, in antient architecture, a kind of pedestal to support busts. See the article PEDESTAL.

SCABIOSA, SCABIOUS, or DEVIL'S BIT, in botany, a plant of the tetrandria-monogynia class, with a flosculous flower, each floscule being monopetalous and tubular, and slightly divided into four or five segments at the limb: there is no pericarpium; the seeds, which are single after each floscule, being crowned with their proper cups, and contained in the common receptacle.

The leaves of scabious stand recommended as aperient, sudorific, and expectorant; but the present practice has little dependance on these virtues.

SCAFFOLD, among builders, an assemblage of planks and boards, sustained by tressels and pieces of wood fixed in the wall; whereon masons, bricklayers, *&c.* stand to work in building high walls, *&c.* and plasterers, in plastering ceilings, *&c.*

Scaffold also denotes a timber-work raised in the manner of an amphitheatre, for the more commodious viewing any shew or ceremony: it is also used for a little stage, raised in some public place, whereon to behead criminals.

SCAGEN, or SCAGERIFF, a promontory of North-Jutland, at the entrance of the Scagerrac-sea, or passage out of the ocean into the Baltic-sea: east longitude 10°, north latitude 58°.

SCALA, in anatomy, a name given to two canals in the cochlea of the ear. See the article EAR.

SCALA, in architecture, the same with stair-case. See the article STAIR-CASE.

SCALA, in geography, a town of the kingdom of Naples, situated on the gulph of Salerno, twenty miles south of the city of Naples.

SCALÆ GEMONIÆ. See the article GEMONIÆ SCALÆ.

SCALADO, or SCALADE, in the art of war, a furious assault made on the wall or rampart of a city, or other fortified place, by means of ladders, without carrying on works in form to secure the men.

SCALE, a mathematical instrument, consisting of several lines drawn on wood, brass, silver, *&c.* and variously divided, according to the purposes it is intended to serve; whence it acquires various denominations, as the plain scale, diagonal-scale, plotting scale, Gunter's-scale, *&c.*

*Construction and use of the plain* SCALE. The plain-scale is an instrument much used in navigation, *&c.* for solving the several cases of sailing. See the article NAVIGATION.

Having described the circle DBCA, (plate CCXXXIX. fig. 2. n° 1.) and divided it into four quadrants, by the diameters AB and CD crossing each other at right angles: 1. To project the line of tangents, from the end C of the diameter CD, erect the perpendicular CG; then dividing the arch CB into nine equal parts, from the center E, through the several divisions of the quadrant CB, draw lines till they cut the perpendicular CG, which will thereby become a line of tangents.

2. For the semi-tangents, or half tangents, let lines be drawn from the point D, through the same divisions upon the arch CB; and they will divide the radius BE into a line of semi-tangents, as is evident from Euclid. lib. 3. prop. 20.

3. For the secants, transfer the lines drawn from the center thro' the several divisions of the quadrant CB to form the line of tangents, to the line EB continued to F, and the line EF will be a line of secants.

4. For the sines, from the several divisions of the quadrant CB, let fall perpendiculars upon the radius CE; which will thereby be divided into a line of sines, to be numbered from E to C for the right sines, and from C to E for the versed sines: and these versed sines may be continued to 180°, if the same divisions be transferred on the other side of the center E.

5. For the chords: the arch CB being divided into nine equal parts, in the points 10, 20, 30, *&c.* if lines be imagined to be drawn from C to these divisions, they will be the chords of their respective arches: wherefore setting one foot of your compasses in the point C, and transferring the several lengths, C 10, C 20, C 30, *&c.* to the line CB, it will thereby be divided into a line of chords. These several lines, which in the figure are drawn but to every tenth degree, might in the very same manner be constructed to every degree, if the circle were made large enough to admit of ninety distinct divisions in the arch of one of its quadrants.

6. A line of rhumbs is thus constructed: divide the arch DB into eight equal parts, in the points 1, 2, 3, 4, *&c.* then

setting

ſetting one foot of the compaſſes in D, transfer the ſeveral diſtances D 1, D 2, D 3, from the arch to the line D B; which by this means will be divided into a line of rhumbs, each of which will anſwer to an angle of 11° 15′.

7. To conſtruct a line of longitude, divide the radius E A into ſixty equal parts, marking every ten with their proper numbers; from theſe diviſions let fall perpendiculars upon the arch A D, and having drawn the line A D, with one foot of the compaſſes in A, transfer the ſeveral diſtances, where the perpendiculars cut the arch to the line A D, which will thereby be divided into a line of longitude.

8. To project the line of latitude, the radius C E being already divided into a line of ſines, lay a ruler from the point B through each of the ſaid diviſions, and mark the points cut on the oppoſite arch A C with the numbers 10, 20, 30, &c. then having drawn the line A C, with one foot of your compaſſes in A, tranſfer the ſeveral interſections of the arch to the ſaid line, which will thereby become a line of latitude.

9. To project the hour-line, draw the tangent I K equal and parallel to the diameter C D, and divide half the arch of each quadrant A C, and A D, from the point A, into three equal parts, which will be 15° each part, for the degrees of every hour from twelve to ſix; each of which parts are to be again ſubdivided into halves and quarters, &c. then drawing lines from the center E, through each of their diviſions and ſubdiviſions, till they cut the tangent I K, the ſaid tangent will thereby be divided into a line of hours.

10. To the above lines may be added a line of inclination of meridians, which is projected in the ſame manner as the hour-line; being only divided into degrees, inſtead of time, every fifteen degrees being equal to an hour.

Now if theſe lines, with their reſpective diviſions, be transferred to a ſcale, and there alſo be added a line of equal parts, the inſtrument called the plain-ſcale will be compleated, as in *ib.* n° 2. and as to the uſes of theſe lines, thoſe of tangents, ſemi-tangents, and ſecants, ſerve to find the centers and poles of projected circles, in the ſtereographic projection of the ſphere, &c. the line of ſines ſerves for the orthographic projection of the ſphere; the line of chords ſerves either to lay down any angle, or meaſure the quantity of one already laid down: the line of rhumbs ſerves with more readineſs than the line of chords, to lay down or meaſure the angle of a ſhip's courſe in navigation: the line of longitude being laid down on the ſcale contiguous to a line of chords of the ſame radius, and numbered the contrary way, ſhews by inſpection how many miles there are in a degree of longitude in each parallel of latitude; reckoning the latitude upon the line of chords, and the miles of longitude upon the line of longitude: the two lines of latitudes and hours are uſed conjointly, and ſerve very readily to mark the hour-lines in the conſtruction of dials, on any kind of upright planes.

For the farther uſes of the plain-ſcale, ſee the articles TRIGONOMETRY, NAVIGATION, PLOTTING, &c.

*Diagonal*-SCALE is projected thus: firſt draw eleven parallel lines at equal diſtances (ſee pl. CCXL. fig. 1.) the whole length of which being divided into a certain number of equal parts, according to the length of the ſcale, by perpendicular parallels, let the firſt diviſion be again ſubdivided into ten equal parts, both above and below; then drawing the oblique lines from the firſt perpendicular below to the firſt ſubdiviſion above, and from the firſt ſubdiviſion below to the ſecond ſubdiviſion above, &c. the firſt ſpace ſhall thereby be exactly divided into one hundred equal parts; for as each of theſe ſubdiviſions is one tenth part of the whole firſt ſpace or diviſion, ſo each parallel above it is one tenth of ſuch ſubdiviſion, and conſequently one hundredth part of the whole firſt ſpace; and if there be ten of the larger diviſions, one thouſandth part of the whole ſcale. If therefore the larger diviſions be accounted units, the firſt ſubdivions will be tenth parts of an unit; and the ſecond ſubdiviſions, marked by the diagonals on the parallels, hundredth parts of an unit. Again, if the larger diviſions be reckoned tens, the firſt ſubdiviſions will be units, and the ſecond ſubdiviſions tenth parts: and if the larger diviſions be accounted hundredths, the firſt ſubdiviſions will be tens, and the ſecond units; and ſo on.

*Gunter's* SCALE, an inſtrument, ſo called from Mr. Gunter its inventor, and is generally made of box: there are two ſorts, the long Gunter and the ſliding Gunter, having both the ſame lines, but differently uſed, the former with the com-

compaffes, the latter by fliding. The lines now generally delineated on thofe inftruments are the following, *viz.* a line of numbers, of fines, tangents, verfed fines, fine of the rhumb, tangent of the rhumb, meridional parts, and equal parts; which are conftructed after the following manner:

The line of numbers is no other than the logarithmic fcale of proportionals, wherein the diftance between each divifion is equal to the number of mean proportionals contained between the two terms, in fuch parts as the diftance between 1 and 10 is 1000, &c. = the logarithm of that number. Hence it follows, that, if the number of equal parts expreffed by the logarithm of any number be taken from the fame fcale of equal parts, and fet off from 1 on the line of numbers, the divifion will reprefent the number anfwering to that logarithm. Thus, if you take .954, &c. (the logarithms of 9) of the fame parts, and fet it off from 1 towards 10, you will have the divifion ftanding againft the number 9. In like manner, if you fet off .903, &c. .845, &c. .778, &c. (the logarithms of 8, 7, 6) of the fame equal parts from 1 towards 10, you will have the divifions anfwering to the numbers 8, 7, 6. After the fame manner may the whole line be conftructed.

The line of numbers being thus conftructed, if the numbers anfwering to the natural fines and tangents of any arch, in fuch parts as the radius is 10000, &c. be found upon the line of numbers, right againft them will ftand the refpective divifions anfwering to the refpective arches, or which is the fame thing, if the diftance between the center and that divifion of the line of numbers, which expreffes the number anfwering to the natural fine or tangent of any arch, be fet off on its refpective line from its center towards the left hand, it will give the point anfwering to the fine or tangent of that arch: thus the natural fine of 30 degrees being 5000, &c. if the diftance between the center of the line of numbers (which in this cafe is = 10000, &c. = the radius) and the divifion, on the fame line reprefenting 5000, &c. be fet off from the center, or 90 degrees, on the line of fines, towards the left hand, it will give the point anfwering to the fine of 30 degrees. And after the fame manner may the whole line of fines, tangents, and verfed fines be divided. See the article GUNTER.

The line of fines, tangents, and verfed fines being thus conftructed, the line fine of the rhumb, and tangent of the rhumb are eafily divided; for, if the degrees and minutes anfwering to the angle which every rhumb makes with the meridian, be transferred from its refpective line to that which is to be divided, we fhall have the feveral points required: thus if the diftance between the radius or center, and fine of 45 degrees = the fourth rhumb, be fet off upon the line fine of the rhumb, we fhall have the point anfwering to the fine of the fourth rhumb; and after the fame manner may both thefe lines be conftructed. The line of meridional parts is conftructed from the table of meridional parts, in the fame manner as the line of numbers is from the logarithms.

The lines being thus conftructed, all problems relating to arithmetic, trigonometry, and their depending fciences, may be folved by the extent of the compaffes only; and, as all queftions are reducible to proportions, the general rule is, to extend the compaffes from the firft term to the fecond, and the fame extent of the compaffes will reach from the third to the fourth; which fourth term muft be fo continued as to be the thing required, which a little practice will render eafy.

SCALE, *fcala*, in mufic, is a denomination given to the arrangement of the fix fyllables invented by Guido Aretine, *ut*, *re*, *mi*, *fa*, *fol*, *la*, called alfo gammut. See the article GAMMUT.

It bears the name fcale (*q. d.* ladder) by reafon it reprefents a kind of ladder, by means whereof, the voice rifes to acute, or defcends to grave; each of fix fyllables being, as it were, one ftep of the ladder.

Scale is alfo ufed for a feries of founds rifing or falling towards acutenefs or gravity, from any given pitch of tune, to the greateft diftance that is fit or practicable, through fuch intermediate degrees as make the fucceffion moft agreeable and perfect, and in which we have all the harmonical intervals moft commodioufly divided. See INTERVAL.

This fcale is otherwife called an univerfal fyftem, as including all the particular fyftems belonging to mufic. See SYSTEM.

*Origin and conftruction of the* SCALE *of mufic.* Every concord or harmonical interval is refolveable into a certain number of

of degrees or parts; the octave, for instance, into three great tones, two less tones, and two semi-tones; the greater sixth into two greater tones, one less tone, and two semi-tones; the fifth into two greater tones, one less tone, and one semi-tone; the fourth into one greater tone, one less tone, and one semi-tone; the greater third into one greater tone, and one less tone; and the lesser third into one greater tone and one less tone. It is true, there are variety of other intervals or degrees, besides greater tones, less tones, and semi-tones, into which the concords may be divided; but these three are preferred to all the rest, and these three alone are in use. Farther, it is not any order or progression of these degrees that will produce melody; a number, for instance, of greater tones, will make no music, because no number of them is equal to any concord, and the same is true of the other degrees; there is a necessity, therefore, of mixing the degrees to make music, and the mixture must be such, as that no two of the same kind be ever next other. See the article CONCORD.

A natural and agreeable order of these degrees, Mr. Malcolm gives us in the following division of the interval of an octave, wherein (as all the lesser concords are contained in the greater) the divisions of all the other simple concords are contained. Under the series are the degrees between each term, and the next. In the first series, the progression is by the less third; in the latter, by the greater third.

| | Great 2d. | gr. 3d. | 4th, | 5th, | 6th, | 7th, | 8th. |
|---|---|---|---|---|---|---|---|
| 1 : | $\frac{8}{9}$ : | $\frac{4}{5}$ : | $\frac{3}{4}$ : | $\frac{2}{3}$ : | $\frac{3}{5}$ : | $\frac{5}{9}$ : | $\frac{1}{2}$. |
| Key or fund. | great tone. | less tone. | semi-tone. | great tone. | less tone. | great tone. | semi-tone. |

| | Great 2d. | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 : | $\frac{8}{9}$ : | $\frac{5}{6}$ : | $\frac{3}{4}$ : | $\frac{2}{3}$ : | $\frac{5}{8}$ : | $\frac{5}{9}$ : | $\frac{1}{2}$. |
| Key or fund. | great tone. | semi-tone. | less tone. | great tone. | semi-tone. | great tone. | less tone. |

Now the system of the octave containing all the original concords, and the compound concords being only the sums of the octave and some less concord; it is evident that, if we would have the series of degrees continued beyond an octave, they are to be continued in the same order through a second as through the first octave; and so on through a third and a fourth octave, &c. and such a series is what we call the scale of music. See OCTAVE.

Of this there are two different species, according as the less or greater third, or the less or greater sixth are taken in; for both can never stand together in relation to the same key or fundamental, so as to make an harmonical scale. But, if by either of these ways, we ascend from a fundamental or given sound to an octave, the succession will be melodious, though the two make two different species of melody. Indeed, every note is discerned with regard to the next; but each of them is concord to the fundamental, except the second and seventh. In continuing the series there are two ways of compounding the names of the simple interval with the octave; thus a greater or lesser tone, or semi tone, above an octave or two octaves, &c. or to call them by the number of degrees from the fundamental, as ninth, tenth, &c. See the article SERIES.

In the two scales above, the several terms of the scale are expressed, by the proportionable sections of a line represented by 1, the key or fundamental of the series. If we would have the series expressed in whole numbers, they will stand as follows, in each whereof the greatest number expresses the longest chord, and the other numbers the rest in order; so that, if any number of chords be in these proportions of length, they will express the true degrees and intervals of the scale of music, as contained in an octave concinnously divided into the two different species above-mentioned.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 540 : | 480 : | 432 : | 405 : | 360 : | 324 : | 288 : | 270. |
| great tone, | less tone. | semi-tone, | great tone. | less tone, | great tone. | less tone. | semi-tone. |
| 216 : | 192 : | 180 : | 162 : | 144 : | 135 : | 120 : | 108. |
| great tone. | semi-tone. | less tone. | great tone. | semi-tone. | great tone. | less tone. | semi-tone. |

This scale the antients called the diatonic scale, because proceeding by tones and semitones. See the article DIATONIC.

The moderns call it simply the scale, as being the only one now in use; and sometimes the natural scale, because its degrees and their order are the most agreeable and concinnous, and preferable, by the consent both of sense and reason, to all other directions ever instituted. Those others are the chromatic and enharmoniac scales, which, with the diatonic, made the three scales or genera of melody of the antients. See the article CHROMATIC, &c.

The design of the scale of music is to shew how a voice may rise and fall less than any harmonical interval, and thereby move from

from one extreme of any interval to the other, in the moſt agreeable ſucceſſion of ſounds. The ſcale, therefore, is a ſyſtem exhibiting the whole principles of muſic; which are either harmonical intervals (commonly called concords) or concinnous intervals. The firſt are the eſſential principles, the other ſubſervient to them, to make the greater variety. See the article MUSIC.

Accordingly, in the ſcale we have all the concords with their concinnous degrees ſo placed, as to make the moſt perfect ſucceſſion of ſounds from any given fundamental or key, which is ſuppoſed to be repreſented by 1. It is not to be ſuppoſed that the voice is never to move up and down by any other more immediate diſtances than thoſe of the concinnous degrees; for, though that be the moſt uſual movement, yet, to move by harmonical diſtances, as concords, at once, is not excluded, but is even abſolutely neceſſary. In effect, the degrees were only invented for variety's ſake, and that we might not always move up and down by harmonic intervals, though thoſe are the moſt perfect, the others deriving all their agreeableneſs from their ſubſerviency to them. See CONCORD.

Add, that beſides the harmonical and concinnous intervals, which are the immediate principles of muſic, and are directly applied in practice; there are other diſcord-relations which happen unavoidably in muſic in a kind of accidental and indirect manner; for, in the ſucceſſion of the ſeveral notes of the ſcale, there are to be conſidered, not only the relations of thoſe that ſucceed others immediately, but alſo of thoſe betwixt which other notes intervene. Now the immediate ſucceſſion may be conducted ſo as to produce good melody, and yet among the diſtant notes there may be very groſs diſcords that would not be allowed in immediate ſucceſſion, much leſs in conſonance. Thus, in the firſt ſeries or ſcale above delivered, though the progreſſion be melodious, as the terms refer to one common fundamental, yet are there ſeveral diſcords among the mutual relations of the terms; *e. gr.* from 4th to 7th is 32 : 45, and from the greater 2d to the greater 6th is 27 : 40, and from the greater 2d to 4th is 27 : 32, which are all diſcords; and the ſame will happen in the ſecond ſeries. See the article DISCORD.

SCALE, in geography and architecture, a line divided into equal parts, placed at the bottom of a map, or plan, to ſerve as a common meaſure for all the parts of the building, or all the diſtances and places of the map.

SCALENE, or SCALENOUS TRIANGLE, *ſcalenum*, in geometry, a triangle whoſe ſides and angles are unequal. See the article TRIANGLE.

SCALENUS, in anatomy, a name given to one of the flexors of the neck. This muſcle has its origin from the firſt, ſecond, and ſometimes the third rib; and is inſerted into the apophyſes of the vertebræ of the neck, and is by ſome juſtly referred to the number of the elevators of the thorax. The ſcalenus is frequently divided into three parts, hence ſome anatomical writers have made three muſcles of it, under the names of the firſt, the ſecond, and the third ſcalenus.

SCALITS, a town of Upper Hungary, ſituated on the confines of Moravia, thirty-five miles north of Preſburg.

SCALLOP, or the IRISH SCALLOP, in ichthyology, a name for the blue-ribbed red pecten variegated with white; being about two inches long, and nearly as much in breadth, having on the ſurface about fifteen broad depreſſed ribs placed at nearly equal diſtances from one another; the valves are very little elevated, and the ears are moderately large, and one a little bigger than the other. See the article PECTEN.

SCALLOWAY, a town on the weſt ſide of Mainland, one of the iſlands of Shetland: weſt long. 1° 5′, north lat. 61° 12′.

SCALPEL, in ſurgery, a kind of knife uſed in anatomical diſſections and operations in ſurgery. See KNIFE.

SCALPER, or SCALPING-IRON, a ſurgeon's inſtrument uſed for ſcraping foul carious bones.

SCALPRA *dentalia*, inſtruments uſed by the ſurgeons to take off thoſe black, livid, or yellow cruſts, which infeſt the teeth, and not only looſen and deſtroy them, but taint the breath. According to the varieties of the occaſion, the ſurgeon has theſe inſtruments of various ſhapes and ſizes; ſome are pointed, and narrow at the end; others are broader pointed, and have edges, others are hooked, or falciform, but theſe are uſually, for convenience of carriage, all adapted to one handle. The manner of uſing them is to begin near the gums, ſupporting the blade with the left-hand, and ſcraping all along the tooth, till the cruſt

cruft is taken off, taking care not to wound the gums, or difplace the teeth.

SCALPTOR ANI, in anatomy. See the article LATISSIMUS.

SCAMILLI IMPARES, in the antient architecture, certain zoccos or blocks which ferve to raife the reft of the members of an order, column, ftatue, or the like, and to prevent their being loft to the eye, which may chance to be placed below the level, or below the projecture of fome of the ornaments.

SCAMMONY, in the materia medica, is a concreted vegetable juice of a plant of the fame name, partly of the refin and partly of the gum-kind, of which there are two forts, diftinguifhed by the names of the places from whence they are brought.

The Aleppo fcammony is of a fpongy texture, light and friable: it is of a faint difagreeable fmell, and its tafte is bitterifh, very naufeous, and acrimonious. The Smyrna fcammony is confiderably hard and heavy, of a black colour, and of a much ftronger fmell and tafte than the former, otherwife it much refembles it.

In general, fcammony is to be chofen friable and eafily powdered, gloffy when frefh broken; fuch as grows white on being moiftened with the fpittle; free from dirt, fand, or other foulneffes, and not too violently acrimonious in its tafte. Scammony is in great efteem and frequent ufe, and would be more fo, if it were more to be depended upon: but there is fo much difference in the purgative virtue of fome maffes of it, and that of others, that it is feldom to be depended upon alone in extemporaneous practice. It is, however, an ingredient in many compofitions of the fhops; and thefe are prefcribed, with other cathartics, for purging of ferous humours. It is in general, however, a better purge for robuft people than for thofe of more delicate conftitutions, though with the correctives with which it is joined, it is given with fafety and fuccefs to children. The chemical writers have given us many preparations of fcammony, among which are a tincture and a refin; but the fcammony in fubftance is preferable to either; for they both irritate more, and yet purge lefs; the refin itfelf given in an equal dofe with the crude fcammony, will give fewer ftools, and thofe attended with worfe gripings. The antients ufed fcammony externally for cutaneous eruptions, and to foften hard tumours; but at prefent it is ufed only as a purge. For the preparation of fcammony by baking it in a quince. See the article DIAGRYDIUM.

SCANDALUM MAGNATUM, in law, is a defamatory fpeech or writing to the injury of a perfon of dignity; for which a writ that bears the fame name is granted for the recovery of damages. By ftatute, no perfon is either by writing or fpeaking to publifh any falfe or fcandalous news of any lord, prelate, officer of the government, judge, &c. on pain of imprifonment, till he produce his author; and if the fame be publifhed in a libel, the publifher is indictable, and may be fined and imprifoned. See LIBEL.

When an action of fcandalum magnatum is brought, the fame muft be fued in the name of the king and the party, on which the plaintiff recovers his damages for the wrong, and the defendant is to be imprifoned on the king's account. It is here to be obferved, that the words fpoke fhall be taken in the worft fenfe, to preferve the honour of great perfons; though at the fame time it is faid, a defendant may juftify in this action, fetting forth the fpecial matter.

SCANDEROON, a port town of Aleppo, in afiatic Turky, fituated on the coaft of the Leffer Afia: eaft long. 37°, north lat. 36° 15′.

SCANDINAVIA, a large country which confifted of Sweden, Denmark, and Norway, which were fometimes under the government of one prince; but is now under the dominion of Sweden and Denmark.

SCANDIX, or SCANDYX, in botany, a plant of the pentandria-digynia clafs, the compound flower of which is made up of hermaphrodite ones on the difc, and female ones in the radius: there is no pericarpium, the feeds, which are two in number and fubluated, being joined together fidewife.

This genus comprehends the venus's comb or fhepherd's needle, and chervil of authors.

SCANNING, *fcanfio*, in poetry, the meafuring of a verfe by feet, in order to fee whether or no the quantities be duely obferved.

The term is chiefly ufed in regard to the greek and latin verfes. Thus an hexameter verfe is fcanned, by refolving it into fix feet; a pentameter, by refolving it into five feet, &c. examples of which may

may be feen under the articles PENTAMETER, HEXAMETER, &c.

SCANSORIUM, in Roman antiquity, an engine whereby people were raifed aloft, that they might fee more conveniently about them. The fcanforium amounted to the fame with what was called the acrobatica among the Greeks. Authors are divided as to the office of this engine. Turnebus and Barbarus, take it to have been of the military kind, raifed by befiegers, high enough to over look the walls, and difcover the ftate of things on the other fide. Baldus rather fuppofes it a kind of moveable fcaffold, or cradle contrived for raifing painters, plaifterers, and other workmen, to the tops of houfes, trees, &c. Some fufpect that it might have been ufed for both purpofes.

SCAPE-GOAT, in jewifh antiquity, the goat which was fet at liberty on the great day of expiation. See EXPIATION.

Spencer is of opinion, that the fcape-goat was called azazel, becaufe it was fent to azazel, *i. e.* the devil; the reafons of which ceremony, he takes to be thefe. 1. That the goat, loaded with the fins of the people, and fent to azazel, might denote the miferable condition of finners. 2. The goat was fent thus loaded to the dæmons, to fhew that they were impure, and to deter the people from worfhipping them. 3. That the goat fent to azazel fufficiently expiating the fins of the Ifraelites, they might the more willingly abftain from the expiatory facrifices of the heathens.

SCAPHISM, σκαφισμος, in perfian antiquity, a kind of torture, or capital punifhment; which confifted in locking the criminal in a fort of box made of the trunk of a tree, with only five holes for his head, arms and legs to come through; then anointing the parts with honey and milk, in order to invite the flies, &c. he was expofed to the fun; and, in this unhappy fituation, he continued till death put an end to his mifery.

SCAPHOIDES, in anatomy, the fame with naviculare os. See the article NAVICULARE OS.

SCAPULA, in anatomy, the fhoulder-blade, a triangular bone, fituated on the outfide of the ribs, and commonly extended from the fecond to the feventh rib; its fuperior pofterior angle, when it is in the leaft ftraining pofition, being about three inches from the fpinal proceffes of the vertebræ, while the long fide between that angle and the inferior one is ftretched obliquely forward as it defcends, having nothing between it and the ribs, except the thin extremities of fome mufcles; but as the fcapula advances forwards to its articulation with the arm bone, its diftance from the ribs increafes.

In the examination of the fcapula, fays Heifter, we are to obferve the head of the bone, with its glenoide cavity, called by fome the acetabulum of the fcapula; its neck; its bafe; its two angles, the fuperior and inferior; its fuperior and inferior coftæ; its anterior furface, which is fmooth and concave; and its pofterior, which is uneven. After thefe we are to obferve its fpine, its creft, and its acromion; its fupra and infra fpinate cavity; its coracoide procefs, and its two incifures, the one between the neck and the acromion, the other behind the coracoide procefs; and the robuft ligament which joins the acromion and coracoide procefs, and prevents the laxation of the os humeri upwards.

The ufes of the fcapula are to fuftain the arms, and join them to the body, to ferve for the infertion of feveral mufcles, and to add fomewhat to the neceffary defence of the parts contained within the thorax.

*Fracture of the* SCAPULA. The fcapula is ufually fractured either near its acromion, or head where it joins the clavicle, or in fome more diftant part. If the fracture happens in the procefs of the acromion, the reduction will be eafily made, by lifting up the arm to relax the deltoid-mufcle, and pufhing the arm evenly upwards, making the fractured parts meet together with the fingers: but notwithftanding their reduction is fo eafy, they eafily flip away again from any flight caufe, and fo are difficultly agglutinated. They are in particular very eafily feparated by the weight and motion of the arm, and by the contraction of the deltoid-mufcle, infomuch that there is fcarce ever an inftance of a fractured acromion being fo perfectly cured, as to admit afterwards of a free motion of the arm upwards: all means muft, however, be ufed to endeavour to keep the replaced bones in their proper fituation. A comprefs, wet with fpirit of wine, is to be applied to the fracture, a ball is to be put under the arm-pit to fupport it; the whole is to be bound up with the bandage commonly called fpica, and the arm is to be fufpended in a fafh or fling

hung

hung about the neck. But if the neck of the ſcapula, which lies under the acromion, or its acetabulum, ſhould be fractured, which is a caſe that indeed very ſeldom happens, and when it does is very difficult to diſcover, it is a hundred to one but from the vicinity of the articulation, the tendons, muſcles, ligaments, nerves, and large veins and arteries, there will follow a ſtiffneſs and loſs of motion in the joint; great inflammation is alſo to be apprehended, and abſceſſes with the worſt ſymptoms, and ſometimes death itſelf.

SCAPULAR, *ſcapulares*, in anatomy, a name given to two pair of arteries, and as many veins; the arteries are the external ſcapular artery, which is ſent from the ſubclavians to the external parts of the ſcapula; and the internal ſcapular artery, which ariſes from the axillary arteries, and goes to the parts that lie under the ſcapula. The ſcapular veins, which are alſo external and internal, ariſe in like manner from the ſubclavians. See ARTERY and VEIN.

SCAPULAR, or SCAPULARY, a part of the habit of ſeveral religious orders in the church of Rome, worn over the gown, as a badge of peculiar veneration for the bleſſed Virgin. It conſiſts of two narrow breadths or ſlips of cloth, covering the back and the breaſt, and hanging down to the feet.

The devotees of the ſcapulary celebrate its feſtival on the 16th of July. The bulls of the popes have from time to time ſecured indulgences without number to them: but what ſets the ſcapulary above all other practices of devotion, is the ſabbatin bull of pope John XXII. in which that pope declares, that the bleſſed Virgin, one day as he was at prayers, gave him a poſitive promiſe, that ſhe would deliver the carmelites her children, and the brethren of the ſcapulary, out of purgatory, on the Sunday after their death, upon three conditions; 1. to wear their ſcapulary till their death: 2. to preſerve their virginity; and, 3. to abſtain from fleſh every Wedneſday and Friday in the year. See the articles FRATERNITIES and CARMELITES.

SCAPUS, in architecture, the fuſt or ſhaft of a column. See the article FUST.

In botany, the ſame word is uſed for the ſtrait ſtalk or ſtem of a plant, ſtanding upright like a pillar or column.

SCAR, or ESCHAR, the ſeam or mark of a wound after it is healed. See WOUND.

SCARA, a town of Sweden in the province of weſt Gothland, ſixty-ſix miles north-eaſt of Gottenburg.

SCARABÆUS, the BEETLE, in zoology, a numerous genus of inſects, of the coleoptera order: the antennæ of the beetles are of a clavated figure, and fiſſile longitudinally; and their eggs all hatch into hexapode worms, from which the young beetles are afterwards produced. See the article COLEOPTERA.

We have already deſcribed the cervus volans or ſtag-beetle; beſides which there are numerous other ſpecies, the deſcription of which may be ſeen in Ray's Hiſtory of Inſects, Linnæus's Syſt. Nat. and Hill's Nat. Hiſt.

SCARBOROUGH, a borough and port-town of Yorkſhire, thirty-ſeven miles north-eaſt of York.

It ſends two members to parliament, and is famous for a medicinal ſpring, which has been the ſubject of great conteſts and diſputes among the phyſical people; all allowing it conſiderable virtues, but ſome attributing them to one ingredient, others to another.

SCARDONNA, a port-town of Dalmatia, ſituated on a bay of the gulph of Venice, forty-five miles north of Spalatto.

SCARE-CROW GULL, in ornithology, a name for the black larus with grey wings and red legs, being of the ſize of the common pigeon. See LARUS.

SCARIFICATION, in ſurgery, the operation of making ſeveral inciſions in the ſkin by means of lancets, or other inſtruments, particularly the cupping-inſtrument. See the article CUPPING.

With regard to the uſefulneſs of ſcarification, Heiſter obſerves, that as much and as thick blood may be diſcharged this way as by phlebotomy, and that of conſequence it muſt be equally beneficial in all diſorders which require bleeding. Beſides, ſcarification is highly neceſſary in violent inflammations, incipient or confirmed mortifications, peſtilential carbuncles, and the like, in order to diſcharge the ſtagnant and vitiated blood, by making many ſmall wounds or inciſions with a ſcalpel or lancet. Heiſter alſo thinks ſcarification of the gums, in the tooth-ach, may not unfrequently be very uſeful; as of the eyes in many diſorders, if performed with caution.

The inſtruments uſed by different operators for ſcarifying the eyes, are different: ſome of the antients uſed a ſteel-raſp in form

form of a ſpoon, ſee letter A plate CCXL. fig. 2. others uſed a prickly thiſtle, like the atractylis; or, the equiſetum majus. But the lateſt and beſt inſtrument for this operation, is the beards of barley or rye, furniſhed with rows of ſmall hooks, repreſented, *ibid.* at letter B. Ten, twelve, or fifteen of theſe beards may be tied together, ſo as to form a kind of bruſh, as at C; with which the inſide of the eye-lids, and even the eye itſelf, may be ſcarified. However, ſuch a bruſh cannot be uſed more than once, as a very ſmall force blunts it; it is alſo to be obſerved, that the beards of old or ripe barley is not ſo proper as thoſe of barley not quite ripe. Heiſter thinks this operation may be of conſiderable ſervice in all inflammatory diſorders of the eyes; but at the ſame time thinks bliſters, phlebotomy, and ſcarifications in other parts might do as well, and be attended with much leſs pain.

To perform this operation, the patient is to be ſeated in a good light, and his head held ſtill by an aſſiſtant, while the ſurgeon preſſes his thumb and fore-finger on the eyelids, ſo as to open them, and turn them outward, that their interior red ſurface may come into view; this is much more conveniently performed on the under than on the upper eyelid. When the ſurface is thus turned up, the ſurgeon draws the ſcarifying inſtrument backward and forward over it with great ſwiftneſs, as alſo over the white of the eye, if there be occaſion; and, by this means, opens all the turgid veſſels, and makes them bleed plentifully, fomenting the eye with a ſpunge dipped in warm water.

When the operation is over, great care is to be taken, that the wounded parts do not cohere together; the patient muſt move the eyelids about at times to prevent this, and the eye, when bound up at night, muſt have a piece of goldbeater's ſkin applied between the eyelids and the eye.

SCARLET, a beautiful bright red. See the articles Red and Colour.

In painting in water-colours, minium mixed with a little vermillion produces a good ſcarlet: but, if a flower in a print is to be painted of a ſcarlet-colour, the lights as well as the ſhades ſhould be covered with minium, and the ſhaded parts finiſhed with carmine, which will produce an admirable ſcarlet.

To dye cloth, ſtuff, *&c.* a ſcarlet, let the ſtuffs be alumed, as for crimſon, in river-water, boil them for two hours, then hang them out a whole night without rinſing; but in the morning rinſe them out. Then in order to dye them, take clean bran-water clean ſkimed, and for every pound of goods put in an ounce of pulverized tartar; having firſt mixed one half of it with half an ounce of cochineal, and when the liquor where the remaining half of the tartar is has boiled, then put in the cochineal, *&c.* Boil them together, afterwards add half an ounce of aqua fortis, in which a ſmall quantity of ſal armoniac (not bigger than a pea) has been diſſolved; which muſt be put in when the ſtuffs have boiled about a quarter of an hour; then boil them together for a little while, let the liquor cool, and rinſe out the ſtuffs.

To dye a ſcarlet in grain, take ſtale clear wheat-bran liquor, a ſufficient quantity; alum, three pounds; enter twenty yards of broad-cloth, and boil it three hours; cool and waſh it; take fair water, a ſufficient quantity; hedder or ſtrawel, a fit quantity; boil them well; cool them with a little water, enter your cloth and make a bright yellow; cool and waſh it again; take freſh wheat-bran-liquor, a ſufficient quantity; madder, four pounds; enter your cloth at a good heat; handle it to a boiling, cool and waſh it well: take more freſh bran liquor; cochineal in fine powder, five ounces; and tartar, three ounces; enter your cloth, and boil an hour or more, keeping it under the liquor, then cool and waſh it.

Scarlet-fever, the ſame with miliary fever. See Miliary fever.

SCAROS, or Saros, a town of Upper Hungary, near the Carpathian mountains: eaſt long. 20° 40′, north latitude 48° 45′.

SCARP, in fortification, is the interior talus, or ſlope of the ditch next the place, at the foot of the rampart.

Scarp, in heraldry, the ſcarf which military commanders wear for ornament. It is borne ſomewhat like a battoon ſiniſter, but is broader than it, and is continued out to the edges of the field: whereas the battoon is cut off at each end. See plate CCXL. fig. 3.

SCARPANTO, an iſland in the Mediterranean, twenty miles ſouth-weſt of Rhodes: eaſt long. 27°, north lat. 36°.

SCARPE, a river of the Netherlands, which

which rifes in the province of Artois, and falls into the river Scheld, a little below Mortaigne.

SCARUS, in ichthyology, a fpecies of the labrus, variegated with purple, green, blue and black. See LABRUS.

SCATCH-MOUTH, in the manege, a bit-mouth, differing from a cannon-mouth in this, that the cannon is round, whereas a fcatch is more upon the oval. That part of the fcatch-mouth that joins the bit-mouth to the branch, is likewife different; a cannon being ftayed upon the branch by a fonceau, and a fcatch by a chaperon, which furrounds the banquet. The effect of the fcatch-mouth is fomewhat greater than that of the cannon-mouth, and keeps the mouth more in fubjection. Commonly fnaffles are fcatch-mouths.

SCAVAGE, a toll or cuftom antiently exacted by m.yors, fheriffs and bailiffs of cities and towns-corporate, and of merchant-ftrangers, for wares expofed and offered to fale within their liberties; which was prohibited by 19 Hen. VII. But the city of London ftill retains this cuftom.

SCAVANT, a term purely french, fignifying learned; it is little ufed in our language, except in the phrafe Journal des Sçavans, a journal of the works of the learned, publifhed monthly at Paris.

SCAVENGERS, two officers annually chofen in every parifh in London and its fuburbs by the church-wardens, conftables, and other inhabitants, to hire perfons called rakers, with carts, to clean the ftreets, and carry away the dirt and filth, with the afhes and duft from every houfe. For which purpofe a fcavenger's tax may be made and levied on the inhabitants, being allowed by the juftices of the peace; but it muft not exceed 4 d. in the pound, of the rent paid for the houfes. Perfons who refufe to take upon themfelves the office of fcavenger, forfeit 10 l. 2 W. and M. c. 2. 1 Geo. I. c. 48. 10 Geo. II. c. 22.

SCELASIUS, in natural hiftory, an animalcule which has vifible limbs, arranged, according to Dr. Hill, in the clafs of the arthronia. See ANIMALCULE.

There are two fpecies of the fcelafius, that with the body of a fuboval figure of the fhape of an egg, its fkin perfectly fmooth, very thin, and of a pale olive-colour, and fo tranfparent, that the lineament of the inteftines are feen eafily through it.

SCENE, *fcena*, in its primary fenfe, denoted a theatre, or the place where dramatic pieces, and other public fhews were exhibited: for it does not appear that the antient poets were at all acquainted with the modern way of changing the fcenes in the different parts of the play, in order to raife the idea of the perfons reprefented by the actors being in different places.

The original fcene for acting of plays was as fimple as the reprefentations themfelves; it confifted only of a plain plot of ground proper for the occafion, which was in fome degree fhaded by the neighbouring trees, whofe branches were made to meet together, and their vacancies fupplied with boards, fticks, and the like; and to complete the fhelter, thefe were fometimes covered with fkins, and fometimes with only the branches of other trees newly cut down, and full of leaves. Afterwards more artificial fcenes or fcenical reprefentations were introduced, and paintings ufed inftead of the objects themfelves. Scenes were then of three forts, tragic, comic, and fatyric. The tragic fcene reprefented ftately magnificent edifices, with decorations of pillars, ftatues, and other things fuitable to the palaces of kings: the comic exhibited private houfes with balconies and windows, in imitation of common buildings: and the fatyric was the reprefentation of groves, mountains, dens, and other appearances; and thefe decorations either turned on pivots, or flid along grooves, as thofe in our theatres.

To keep clofe to nature and probability, the fcene fhould never be fhifted from place to place in the courfe of the play: the antients were pretty fevere in this refpect, particularly Terence, in fome of whofe plays the fcene never fhifts at all, but the whole is tranfacted at the door of fome old man's houfe, whither, with inimitable art, he occafionally brings the actors. The French are pretty ftrict with refpect to this rule; but the Englifh pay very little regard to it.

Scene is alfo a part or divifion of a dramatic poem. Thus plays are divided into acts, and acts are again fubdivided into fcenes; in which fenfe the fcene is properly the perfons prefent at, or concerned in the action on the ftage at fuch a time: whenever, therefore, a new actor appears, or an old one difappears, the action is changed into other hands; and therefore a new fcene then commences.

It is one of the laws of the ftage, that

the scenes be well connected; that is, that one succeed another, in such a manner as that the stage be never quite empty till the end of the act. See the articles Act, Drama, &c.

Scenic Games, among the antients, were entertainments exhibited on the scena or theatre, including plays, dancing, and other theatrical performances. The Romans were four hundred years without any scenic games, and at their institution some actors were sent for from Hetruria; who, without reciting any thing, danced to the sound of instruments; at length they began to rehearse verse, from thence they proceeded to plays, and thus by degrees, growing more and more perfect, their scenical shews were at last represented, with a justness and magnificence beyond every thing the world had ever seen.

SCENOGRAPHY, in perspective, the representation of a body on a perspective plane; or, a description thereof in all its dimensions, such as it appears to the eye. See the article Perspective.

The ichnography of a building, &c. represents its plan, or ground-work; the orthography, is a view of the front, or one of its sides; and the scenography, is a view of the whole building, front, sides, height, and all, raised on the geometrical plan. See the articles Ichnography, and Orthography.

To exhibit the scenography of any body, 1. Lay down the basis, ground-plot, or plan of the body, according to the method taught under the article Perspective. 2. Upon the several points of the plan, raise the perspective heights: thus will the scenography of the body be completed, excepting that a proper shade is to be added.

The method of raising the heights is as follows: on any point, as C (plate CCXLI. fig. 1.) to raise a perspective altitude, answerable to an objective altitude PQ; on the terrestrial line raise a perpendicular PQ, equal to the given objective altitude; from P and Q, to any point, as T, draw light lines PT and QT; from the given point C, draw a right line CK, parallel to the terrestrial line DE, and meeting the right line QT in K; and in the point K, upon the line KC, erect a perpendicular IK, which will be the scenographic altitude required.

The application of this general method of drawing the scenography of a body, is not so obvious, in every case, but that it may be necessary to illustrate it by a few examples.

Example I. To exhibit the scenography of a cube, viewed by an angle: 1. As the basis of a cube viewed by an angle, standing on a geometrical plane is a square, viewed by an angle; draw a square, viewed angular-wise, on the perspective table, or plane. 2. Raise the side HI (fig. 2.) of the square perpendicularly on each point of the terrestrial line DE; and to any point, as V, of the horizontal line HR, draw the right line VI and VH. 3. From the angles *d*, *b*, and *c*, draw *c* 1, *d* 2, &c. parallel to the terrestrial line DE. 4. From the points 1 and 2, raise L 1 and M 2 perpendicular to the same. Lastly, since HI is the height to be raised in *a*, LI in *c* and *b*, and M 2 in *d*; in *a* raise the line *fa* perpendicular to *a*E; in *b* and *c*, raise *bg* and *ce* perpendicular to *bc* 1; and lastly, raise *dh* perpendicular to *d* 2, and make $af = HI$, $bg = ec = L\,1$, and $hd = M\,2$; if then the points *g*, *h*, *e*, *f*, be connected by right lines, the scenography will be compleat.

Ex. II. To exhibit the scenography of a hollow quinquangular prism. 1. Since the base of a hollow quinquangular prism, standing on a geometrical plane, is a pentagon, with a limb or breadth of a certain dimension, find the appearance of this pentagon on a table, or plane. 2. On any point, as H, of the terrestrial line DE (fig. 3.) raise a perpendicular HI, equal to the objective altitude, and to any point, as V, of the horizontal line HR, draw the lines HV and IV. 3. From the several angles *a*, *b*, *d*, *e*, *c*, of the perspective ichnography, both the internal and external ones, draw right lines, as *b* 2, *d* 3, &c. parallel to the terrestrial line; and from the points 1, 2, 3, raise perpendiculars to the same, as L 1, M 2, *m* 2, N 3, *n* 3. If these then be raised in the correspondent points of the ichnography, as in the preceding article, the scenography will be compleat.

Ex. III. To exhibit the scenography of a cylinder. 1. Since the base of a cylinder, standing on a geometrical plane, is a circle, seek the appearance of a circle; in the points *a*, *b*, *d*, *f*, *h*, *g*, *e*, *c*, (fig. 4.) raise the apparent altitudes, as in the preceding articles. If now their upper lines

be connected by curve lines, in the base *a, b, d, f, c, h, e, c,* the scenography of their circle will be compleat.

It is evident that those lines are to be omitted, both in the plan and in the elevation, which are not exposed to the eye; though they are not to be disregarded from the beginning, as being necessary for the finding of other lines; *e. gr.* in the scenography of the cube, viewed angle-wise, the lines *bd* and *de* (fig. 2.) in the base, and the line *dh* in the elevation, are hid from the eye, and are therefore omitted in the description. But, since the point H is not to be found, unless the point *d* be had in the ichnography, nor the lines *gh* and *de* be drawn without the height *dh*, the appearance of the point *d* is as necessary to be determined in the operation, as the height *h d*.

Ex. IV. To exhibit the scenography of a pyramid standing on its base. Suppose, *e. gr.* it were required to delineate a quadrangular pyramid, viewed by an angle: 1. Since the base of such pyramid is a square seen by an angle, draw such a square. 2. To find the vertex of the pyramid, *i. e.* a perpendicular let fall from the vertex to the base, draw diagonals mutually intersecting each other in *e* (fig. 5.) 3. On any point, as H, of the terrestrial line DE, raise the altitude of the pyramid HI; and, drawing the right lines HV and IV to each point of the horizontal line HR, produce the diagonal *rb*, until it meet the line VH in *h*. Lastly, from *h* draw *hi* parallel to HI. This, being raised on the point *e*, will give the vertex of the pyramid K; consequently the lines *d*K, K*a*, and K*b* will be determined at the same time. After the like manner is the scenography of a cone delineated.

Ex. V. To exhibit the scenography of a truncated pyramid. Suppose the truncated pyramid quadrangular: first then, if from the several angles of the upper base be conceived perpendiculars, let fall to the lower base, we shall have a pentagon, with another inscribed therein, whose sides are parallel to those of the former: this coincides with a pentagon, furnished with a rim or breadth, &c. and may therefore be delineated in the same manner. 2. Raising the altitude of the truncated pyramid IH (fig. 6.) determine the scenographic altitudes to be raised in the points *a, b, c, d.* If now the points *f, g, h, i, k,* be connected by right lines, and the lines *lk, fm, gn, ho,* be drawn, the scenography will be compleat. By drawing two concentric circles in a geometrical plan, and doing every thing else, as in this problem, the scenography of a truncated pyramid will be drawn.

Ex. VI. To exhibit the scenography of walls, columns, &c. or to raise them on a pavement. 1. Suppose a pavement AF, HI (fig. 7. 8.) represented in a plan, together with the bases of the columns, &c. if there be any. 2. Upon the terrestrial line set off the thickness of the wall B A and 1, 3. 3. Upon A and B, as also upon 3 and 1, raise perpendiculars AD and BC, as also 3, 6, and 1, 7. 4. Connect the points D and 6 with the principal point V, by the right lines DV and 6 V. 5. Upon I and H raise perpendiculars HG and EF. Thus will all the walls be delineated. Now to raise the pillars, &c. there needs nothing but from their several bases (whether square or circular) projected on the perspective plan, to raise the indefinite perpendiculars; and on the fundamental line, where intersected by the radius F*a* passing through the base, raise the true altitude AD; for DV, being drawn as before, the scenographical altitudes will be determined.

Ex. VII. To exhibit the scenography of a door in a building. Suppose a door required to be delineated in a wall DEFA (fig. 7.) 1. Upon the fundamental line set off its distance AN from the angle A, together with the breadths of the posts NI and LM, and the breadth of the gate itself LI. 2. To the point of distance K, from the several points N, I, L, M, draw right lines KN, KI, KL, KM, which will determine the breadth of the door *li*, and the breadths of the posts *cn* and *ml*. 3. From A to O set off the height of the gate AO, and from A to P, the height of the posts AP. 4. Join O and P with the principal point by right lines PV and OV. 5. Then, from *n, i, l, m,* raise perpendiculars, the middle ones whereof are cut by the right line OV in *o*, and extreams, by the right line VP in *p*. Thus will the door be delineated, with its posts; if the door were to have been exhibited in the wall EFGH, the method would be nearly the same: For, 1. Upon the terrestrial line, set off the distance of the door from the angle, and thence also the breadth of the door RT. 2. From R and T draw right lines to the principal point V,

to have the breadth $rt$ in the perspective plan. 3. From $r$ and $t$ raise indefinite perpendiculars to F H. 4. From A to O set off the true height A O. Lastly, from O to the principal point V, draw the right line O V, intersecting E F in Z, and make $rr$ and $tt$ equal to T Z. Thus is the door $rr$, $tt$, drawn, and the posts are easily added, as before.

Ex. VIII. To exhibit the scenography of windows in a wall. When you know how to represent doors, you will find no difficulty in adding windows; all that is here further required, being to set off the height of the window from the bottom of the ground. The whole operation is as follows: 1. From 1 to 2, set off the thickness of the wall at the window; from 3 to 4, its distance from the angle 3; and from 4 to 5, its breadth. 2. From 4 and 5, to the point of distance L, draw the right lines E 5 and L 4, which will give the perspective breadth 10, 9 of the window. 3. From 10 and 9, raise perpendiculars to the pavement, that is, draw indefinite parallels to 6, 3. 4. From 3 to 11, set off the distance of the window from the pavement 3, 11, and from 11 to 12, its height 11, 12. Lastly, from 11 and 12, to the principal point V, draw the lines V 11 and V 12, which intersecting the perpendiculars 10, 13, and 9, 14, in the points 13 and 14, as also in 15 and 16, will exhibit the appearance of the window.

From these examples which are only applications of the first grand rule, it will be easily perceived what method to take to delineate any other object, and at any height from the pavement.

SCENOPEGIA, in jewish antiquity, the same with the feast of tabernacles. See the article TABERNACLE.

SCEPTER, a kind of royal staff, or battoon, borne by kings, on solemn occasions, as an ensign of command and authority. See the article REGALIA.

The scepter is of greater antiquity than the crown. The greek tragic poets, put scepters into the hands of the most antient kings they ever introduce. Among the Romans, the scepter was first assumed by Tarquin the elder. We are informed by Le Gendre, that the scepter borne by the first race of the french kings was a golden rod, crooked at one end like a crosier, and almost always of the same height as the king himself.

SCEPTER, in astronomy, one of the six new constellations of the southern hemisphere consisting of seventeen stars.

SCEPTICISM, the doctrines and opinions of the sceptics, whose distinguishing tenet was, that all things are uncertain and incomprehensible, and that the mind is never to assent to any thing, but to remain in perpetual doubt and suspence. This doctrine was also called pyrrhonism, from the name of its author. See the article PYRRHONIANS.

SCHAFFHOUSE, the capital of the canton of Scaffhouse, one of the most northern cantons of Switzerland: east long. 8° 40′, north lat. 47° 42′.

SCHALHOLT, the capital of Iceland, subject to Denmark: west long. 19° north lat. 64° 30′.

SCHAMACHIA, a city of Persia, in the province of Chirvan, situated on the west side of the Caspian Sea, in east long. 50°, north lat. 41°.

SCHEAT, or SEAT, a fixed star of the second magnitude, in the juncture of the leg with the left shoulder or pegasus. See the article PEGASUS.

SCHELD, a river which rises in the confines of Picardy, and runs north-east by Cambray, Valenciennes, Tournay, Oudenarde, &c. and receiving the Lis at Ghent, runs east by Dendermond, and then north to Antwerp, below which city it divides into two branches, one called the Wester-Scheld, which separates Flanders from Zeland, and discharges itself into the sea near Flushing; and the other called the Oster-scheld, which runs by Bergen-op-zoom, and afterwards between the islands Beveland and Schowen, and a little below falls into the sea.

SCHELLENBURG, a fortress of Germany, in the circle of Bavaria, situated on the Danube, twenty-two miles west of Ingolstadt.

SCHELLING, an island of Holland, at the entrance of the Zuyder Sea, between Flie Island and Ameland: east long. 5° 20′, north lat. 53° 34′.

SCHEMNITZ, capital of the mine towns in Upper Hungary, sixty miles north-east of Presburg.

SCHENECTIDA, a fortress of New-York, in America, situated on Hudson's River, in the province of Albany, a hundred miles north of New York city.

SCHETLAND, or SHETLAND, about forty islands, which constitute part of the country of Orkney, or the Orcades, in Scotland, valuable on account of the herring-

herring-fishery on their shores: situated between 1° east, and 2° west longitude, and between 61° and 62° of north latitude.

SCHEUCHZERIA, in botany, a genus of the hexandria-trigynia class of plants, having no corolla; the fruit consists of three roundish compressed inflated bivalve reflexo-distant capsules; the seed is single and oblong; there are sometimes six germina, and as many capsules, but three is the more natural and usual number.

SCHINUS, in botany, a genus of the decandria-monogynia class of plants, the corolla whereof consists of five patent petals; the fruit is a globose berry, containing a large globose single seed.

SCHIRAS, or SHERAS, a city of Persia, in the province of Fars, 180 miles south of Ispahan; reckoned the second city in that kingdom.

SCHISM, a separation, or breaking off from communion with any church; on account of some disagreement in matters of faith or discipline.

Ecclesiastical history presents us with a view of several considerable schisms, in which large bodies of men separated from the communion of the church. Such were in the fourth century the schisms of the donatists, and the many sects that sprung up in the church, as the photinians, apollinarians, &c. the schism of the church of Antioch, occasioned by Lucifer, bishop of Cagliari, in Sardinia, in the fifth century, the schism of the church of Rome, between Laurentius and Symmachus: in the ninth century, the separation of the greek church from the latin; and particularly the grand schism of the popes of Rome and Avignon, in the fourteenth century, which lasted till the end of the council of Pisa, 1409.

The romanists reckon thirty-four schisms in their church, and bestow the name english schism on the reformation in this kingdom. Those of the church of England, again apply the term schism to the separation of the nonconformists, *viz.* the presbyterians, independants, quakers, &c. who contend for a further reformation.

SCHOENUS, in botany, a genus of the triandria monogynia class of plants, the proper corolla whereof consists of six permanent lanceolated acute and connivent petals, unequal in size and situation, disposed in a kind of imbricated manner, and the exterior ones shorter than the rest; there is no pericarpium; the seed is single, glossy, of an oval, but somewhat triquetrous form, largest in the upper part, and contained till ripe in the corolla.

SCHOLASTIC, σχολαστικὸς, something belonging to the schools. See SCHOOL.

Scholastic was a long time a title of honour, at first only given to such as distinguished themselves by their eloquence in declaiming, &c. After Nero, this appellation was bestowed upon advocates, and afterwards it became restrained to such as had the government of ecclesiastical schools, established under the first race of french kings, who instructed the clerks of the church first in the humanities, then in theology and the liturgy. Among the greeks, this was the name of an office or dignity answering to our divine or theologue.

Scholastic divinity, is that part or species of divinity which clears and discusses questions by reason and arguments, in which sense it stands, in some measure, opposed to positive divinity, which is founded on the authority of fathers, councils, &c. The school-divinity is now fallen into the last contempt, and is scarce regarded any where, but in some of the universities, where they are still by their charters obliged to teach it.

SCHOLIAST, or COMMENTATOR, a grammarian, who writes scholia, that is, notes, glosses, &c. upon antient authors, who have written in the learned languages. See the next article.

SCHOLIUM, a note, annotation, or remark, occasionally made on some passage, proposition, or the like. This term is much used in geometry, and other parts of mathematics, where after demonstrating a proposition, it is customary to point out how it might be done some other way, or to give some advice, or precaution, in order to prevent mistakes, or add some particular use, or application thereof.

SCHOOL, *schola*, a public place, wherein the languages, humanities, or other arts and sciences are taught. Thus we say, grammar-school, writing school, &c.

SCHWALBASH, a town of Germany, in the circle of the Upper Rhine, and in the territory of the Wetteraw, and county of Nassau, eight miles north of Mentz.

SCHWALBEA, in botany, a genus of the didynamia-angiospermia class of plants, the corolla whereof consists of a ringent single petal, the tube is of the length of the

the cup, the limb is erect, the superior lip is erect, concave, and quite entire, the lower one is trifid and obtuse; the fruit is either a bilocular capsule, or there is no pericarpium; the seed is single, roundish, and small.

SCHWARTSBURG, a town of Germany, in the circle of Upper Saxony, and landgrave of Thuringia, eight miles south-east of Gotha.

SCHWARTZENBURG, a town of Germany, in the circle of Franconia, twenty miles east of Wurtsburg.

SCHWATS, a town of Germany, in the county of Tyrol, situated on the river Inn, twenty miles north-east of Inspruc.

SCHWEIDNITZ, a town of Bohemia, in the dutchy of Silesia, capital of a dutchy of the same name, situated twenty-six miles south of Breslaw.

SCHWEINFURT, an imperial city of Germany, in the circle of Franconia, and bishopric of Wurtsburg, situated on the river Maine, in east long. 10° 15′, north 50° 15′.

SCIÆNA, in ichthyology, a genus of the acanthopterygious class of fishes, the whole head and covering of the gills are scaly, and one of the laminæ of these coverings serrated at the edges, the body is compressed and broad, the back is acute, there are teeth in the jaws and fauces, the palate and tongue are smooth; there is only one fin on the back, which is divided in the middle to the very base; the tail is equal at the extremity; this genus comprehends the umbra and the umbrino.

SCIARRI, in natural history, the matter which runs down in burning torrents from the craters of volcanos, and which probably contains mineral and metallic particles, it being ponderous and hard. Some of the sciarri are coarse, and others fine and polished on the surface; some of them are black, others grey, others reddish, and others of the colour of iron, and many of them have coverings of pure sulphur over their whole surface. They seem to be the result of many sorts of minerals melted together.

SCIATICA, the HIP-GOUT, a violent and obstinate pain in the hip, chiefly in the joint, where the head of the thigh-bone is received into the acetabulum of the coxendix. This pain will sometimes extend itself to the lower part of the loins, to the thigh, leg, and even the extremity of the foot, yet outwardly there is no swelling, no inflammation, nor change of colour in the skin; sometimes there is such a spasm of the muscles on the side affected, that the patient cannot stand upright without the utmost pain. When the sciatica has continued very long, there is such a collection of pituitous humour in the cavity of the joint, that by relaxing the ligaments, it often causes a luxation. Sometimes it causes an aridura, or wasting away of the adjacent parts. When the pain leaves the hip, and moves downwards, it is a sign that the spasms are resolved; a violent motion of the body generally exasperates the pain. This disorder may arise from the same cause with that which produces the gout; but it is most generally the effect of catching cold, or being exposed to the open air; it may also be occasioned by contusions and venereal disorders. See the article GOUT, &c.

After a gentle cathartic, or clyster, bleeding will be proper, especially in the ancle; also leeches applied to the hæmorrhoidal veins, have been found beneficial; strong purges are hurtful, but mercurius dulcis with scammony, or some other purgative, will be of service; some give mercurial emetics, and afterwards mercurial purgatives, repeated twice a week, or as occasion requires, for six times. If the patient is old, lenient purgatives will be most proper, and on intermediate days a dose of calomel, which is afterwards to be purged off, and so repeated alternately for some time. Outwardly, the linimentum saponaceum is recommended by Riverius, Junker, and others; the part is to be anointed with it near the fire. Riverius says, he has known an obstinate sciatica cured in one day, by applying six cupping glasses on and about the part affected, and then anointing it with oil of bricks hot, and afterwards covering it with a linen-cloth, made very hot. Zacutus Lusitanus affirms, that the sciatica has been cured in a few hours, by applying eight or ten leeches to the part affected. Baglivi observes, that if nothing else will do, recourse must be had to caustics, particularly the leaves of ranunculus, or a mixture of quick lime, and soft soap.

SCIENCE, *scientia*, in philosophy, denotes any doctrine, deduced from self evident and certain principles, by a regular demonstration. See DEMONSTRATION, METHOD, and KNOWLEDGE.

Sciences may be properly divided as follows: 1. The knowlege of things, their constitutions, properties, and operations:

rations: this, in a little more enlarged ſenſe of the word, may be called φυσικη, or natural philoſophy; the end of which is ſpeculative truth. See the article *Natural* PHILOSOPHY.

2. The ſkill of rightly applying theſe powers, πρακτικη: the moſt conſiderable under this head is ethics, which is the ſeeking out thoſe rules and meaſures of human actions that lead to happineſs, and the means to practiſe them; and the next is mechanics, or the application of the powers of natural agents to the uſes of life. See ETHICS and MECHANICS.

3. The doctrine of ſigns, σημειωτικη; the moſt uſual of which being words, it is aptly enough termed logic. See the article LOGIC.

This, ſays Mr. Locke, ſeems to be the moſt general, as well as natural, diviſion of the objects of our underſtanding. For a man can employ his thoughts about nothing but either the contemplation of things themſelves for the diſcovery of truth; or about the things in his own power, which are his actions, for the attainment of his own ends; or the ſigns the mind makes uſe of, both in the one and the other, and the right ordering of them for its clearer underſtanding. All which three, *viz.* things, as they are in themſelves knowable; actions, as they depend on us in order to happineſs; and the right uſe of ſigns, in order to knowledge, being *toto cœlo* different, they ſeem to be the three great provinces of the intellectual world, wholly ſeparate and diſtinct one from another.

SCIENTIFIC, or SCIENTIFICAL, ſomething relating to the pure, ſublimer ſciences; or, that abounds in ſcience or knowledge.

SCILLA, the SQUILL, in botany, a genus of the hexandria-monogynia claſs of plants, the corolla whereof conſiſts of ſix oval deciduous and very patent petals: the fruit is a ſmooth capſule, of a ſuboval figure, marked with three furrows, formed of three valves, and containing three cells: the ſeeds are numerous and roundiſh.

The middle part of the root of this plant is only uſed in medicine: the apothecaries cut the root perpendicularly in two; and ſeparating the heart and the outer parts, they expoſe the others to dry: this root is extremely acrid, attenuant and diſſolvent: it is apt to prove emetic in whatever form it is given, but this may be prevented by adding a few grains of cinnamon to it: it then becomes a powerful medicine in all obſtructions of the viſcera: it promotes urine and the menſes, and cuts the tough phlegm which almoſt choaks in aſthmas and many other diſorders of the breaſt: the moſt uſual form in which it is preſcribed is that of the oxymel, made of a ſtrong infuſion of the root in vinegar, or made into a ſyrup of honey.

SCILLY, a cluſter of iſlands and rocks, ſituated in the Atlantic-ocean: weſt longitude 7°, north latitude 50°.

SCIO, an iſland of Turky, in the Archipelago, ſituated in eaſt longitude 27°, north 38° 15′.

SCIOPTIC, a ſphere, or globe of wood, with a circular hole or perforation, wherein a lens is placed. It is ſo fitted that, like the eye of an animal, it may be turned round every way, to be uſed in making experiments of the darkened room. See CAMERA OBSCURA.

SCIRE-FACIAS, in law, a judicial writ moſt commonly iſſued to call a perſon to ſhew cauſe to the court whence it iſſues, why execution of a judgment paſſed ſhould not be made out; as where a plaintiff has recovered debt or damages in a court of record, and does not take out execution in a year and a day after judgment recovered: in that caſe he ſhall have this writ to ſummon the defendant to ſhew cauſe why execution ſhould not be had againſt him upon the ſaid judgment; which if the defendant does not, judgment is given and the plaintiff ſhall have execution. Where a plaintiff or defendant dies, execution may not be ſued out on a judgment till the writ of ſcire-facias is brought and judgment given thereupon. A ſcire facias muſt likewiſe iſſue where judgment is recovered againſt a feme ſole who marries within the year and day, to ſummon the huſband to ſhew cauſe, *&c.* And when a judgment is obtained againſt a teſtator, a ſcire-facias iſſues againſt the executor, though within a year after the judgment is had; and alſo againſt an adminiſtrator to an inteſtate.

SCIRO, an iſland of Turky, in the Archipelago, ſituated eaſt long. 25°, lat. 38° 15′.

SCIRPUS, in botany, a genus of the triandria-monogynia claſs of plants: there is no corolla nor pericarpium: the ſeed after every flower is ſingle, and of a triquetrous figure, acuminated, and has

has villi or hairs on it longer than the cup.

This genus comprehends the club-rufh and bul-rufh.

SCIRRHUS σκιῤῥος, in furgery and medicine, a hard tumour of any part of the body, void of pain, arifing from the infpiffation and induration of the fluids contained in a gland, though it may appear in any other part, efpecially in the fat, being one of the ways wherein an inflammation terminates. See the articles TUMOUR and INFLAMMATION.

The feat of a fcirrhus is very various, not being confined to the internal parts alone, *viz.* the liver, fpleen, lungs, mefentery, pancreas, and, in females, to the uterus; but frequently happens to the external parts, as the lips, tongue, tonfils, fauces, palate, gum, neck, mammæ, axillæ, groin, penis, and tefticles, and that generally after a previous inflammation of thefe parts. As foon as a fcirrhus is formed, the neighbouring parts of courfe are impeded in the performance of their offices, and, according to the nature of the part affected, become fubject to inflammations, exulcerations, cancer, gangrene, tabes, ftiffnefs, immobility, or the like.

With regard to an external fcirrhus, when it is of a long ftanding, and the patient infirm, Heifter is of opinion that it is better to abftain entirely from any attempt to cure it, particularly if it is in the breafts of women, for fear the difeafed part fhould become apparently cancerous. On the other hand, when the fcirrhus is but newly formed, attended with no vehement pain or hardnefs, and when the patient is otherwife of a found habit of body, external and internal remedies may be ufed to fet the confined fluids at liberty. The internal remedies which are found principally ferviceable in anfwering this intention, are the decoction of the woods, digeftive tinctures or effences, and mild mercurials, giving between whiles relaxing medicines to refolve the infpiffated humours. With regard to external refolvents, plafters claim the firft place, fuch as are made with the warm gums, as gum ammoniac, galbanum, opopanax, fagapenum, *&c.* which may be applied alone or mixed together; the next place is held by cataplafms: fome highly recommend acid vapours in this cafe, and to receive the fteam of boiling vinegar upon the difeafed part: others fet fulphur on the fire, and hold the part over the fume: others, again, are fond of fumigations of cinnabar; but mercurial medicines perform wonders in this cafe. But if all medicines fhould prove unfuccefsful, and the fcirrhus is free and moveable, and its fituation threatens no great danger from the neighbouring veffels, and that the ftrength of the patient will be fufficient to undergo the operation, to prevent the cafe from turning cancerous, it muft be cut out with a knife, after which the wound muft be dreffed with the linimentum arcei, or any other vulnerary medicine, and healed as other wounds. See the article WOUND.

For the methods of preventing the part from turning cancerous, fee the article CANCER.

When this diforder feizes the internal parts, and the feveral fymptoms cannot be difcovered by the fenfes, in that cafe the effects of a fcirrhus are only capable of guiding the phyfician's judgment and directing his practice: but obfcure cafes of this nature are illuftrated by a confideration of the following circumftances. If the caufe pre-difpofing to the generation of a fcirrhus, is an atrabilious fpiffitude of the humours arifing from a long protracted ufe of auftere, terreftrial and coarfe aliments without violent exercife, or from a long continued influence of paffion, efpecially grief; and if, at the fame time, the efficient caufe is a contufion; if an inflammation, is neither refolved nor changed into a fuppuration; if the ufual difcharge of the menfes, or hæmorrhoides, is fuppreffed; or if the taint is hereditary, we may juftly from fuch caufes dread an internal fcirrhus. When after a mature confideration of all circumftances, it is probable that a fcirrhus is capable of refolution, emollients which relax the veffels, and refolvents which, without exciting a great commotion, fufe the concreted humours, are the only medicines to be ufed. Aretæus affirms, that in order to remove a fcirrhus, or hardnefs of the fpleen, we are to ufe medicines as hot as fire. In a recent fcirrhus of the liver, Junker directs that the bowels be cleanfed and relaxed by a clyfter made of a decoction of mallows, camomile-flowers, mullein, and fennel-feed. After this, bleeding in the foot is to be ordered, and then the nitrous and other refolvent medicines are to be given, fuch as tartar of vitriol and the like. After this, medicated wines fhould

be

be given as the common drink, prepared with byrony and arum-roots, centaury, hyssop, and maidenhair-leaves, sassafras, senna, black hellebore, and rhubarb: and externally, plasters of the resolvent and strengthening kinds are to be applied. It is said that no internal medicine is more efficacious than vinegar saturated with an highly pure alkaline salt; or, if to a pint of rhenish-wine we add half an ounce of the salt of carduus benedictus, or the stalks of beans, or some such substance, of which mixture the patient is to take half an ounce three or four times a day.

The efficacy of quicksilver in removing obstructions is universally acknowledged, and both the external and internal use of it has often greatly contributed to the cure of a benign and incipient scirrhus; for when it has acquired a stony hardness, and begins to be malignant, no relief can be expected from the strongest mercurial preparations, nor from a salivation excited by quicksilver, but all the symptoms are rather increased by these means; and in consequence of the increased motion of the humours, the scirrhus is the sooner changed into a cancer: and after all directions for the treatment, it is to be acknowledged that an obdurate and inveterate scirrhus admits of no remedy.

SCISSARS, a well known instrument for cutting any thing asunder. See the article FORCEPS.

SCITE, or SITE. See the article SITE.

SCIURUS, the SQUIRREL. See the article SQUIRREL.

SCLAREA, in botany, the name by which Tournefort calls several species of salvia, or sage. See the article SAGE.

SCLAVONIA, a province subject to the house of Austria, and bounded on the north east by the rivers Drave and Danube, which separate it from Hungary; being about two hundred miles long, and sixty broad.

It takes its name from the Sclavi, an antient people of european Scythia; from whom is likewise derived the sclavonic language, which is said to be the most extensive language in the world, except the arabic; as being the common mother of the russian, hungarian, polish, bulgarian, carinthian, bohemian, &c. languages.

SCLERANTHUS, KNAWEL, in botany, a genus of the decandria digynia class of plants, without any flower petals: the fruit is an oval capsule, contained in the base of the cup, which is closed at the neck; and the seeds are two, convex on one side and plane on the other.

The hoary-perennial-knawel is the plant, at the roots of which is found the coccus polonicus, a very valuable scarlet dye. See COCCUS and SCARLET.

SCLEROPHTHALMIA, in medicine, a species of ophthalmia, wherein the eye is dry and inflamed, as are also the eye-brows. See OPHTHALMIA.

SCLEROPTERA, in natural history, the name of that class of insects which have four wings, the exterior flexile, and the interior membranaceous; and which have the aperture of the mouth bent under the breast.

SLCEROTICA, in anatomy, one of the tunics, or coats, of the eye: it is hard, opake, and extended from the cornea to the optic nerve; its forepart is transparent, and called the cornea. See the articles EYE, CORNEA, and TUNICA.

SCLEROTICS, medicines proper to harden and consolidate the flesh of the parts to which they are applied; as purslain, house-leek, flea-wort, garden-nightshade, &c.

SCOLOPAX, the WOOD-COCK, in ornithology, a species of numenius, with a black line on each side the head: it is a very beautiful as well as delicate bird, somewhat smaller than the partridge; the upper part of its body being of a mixed colour, mottled with black, grey, and a reddish-brown: the breast and belly are a pale-grey, with little tranverse lines of a bright brown: the upper part of the throat is of a whitish-yellow, and the hinder part of the head chiefly black, with a few transverse lines of brown on it: the male is somewhat darker than the female, in its general colouring. See NUMENIUS.

SCOLOPENDRA, in zoology, an insect with a very slender and long body, and furnished with a vast number of legs.

According to Dale, it is sometimes used as a depilatory boiled in wine.

SCOLYMUS, in botany, a genus of the syngenesia-polygamia-æqualis class of plants, with a paleaceous receptacle, and imbricated cup, and no down: the flower is composed of a number of semifloscules, each placed on an embryo-seed.

SCOMBER, in ichthyology, a genus of the acanthopterygious order of fishes, the tail of which is very much forked, so as to represent the figure of a crescent: there are seven officles in the branchiostege mem-

brane, on each fide; the uppermoft of which is covered by the operculum of the gills. This genus, befides the common mackrel, comprehends the tunny, the horfe-mackrel, and feveral other fpecies. See MACKREL, TUNNY, &c.

SCONCE, in fortification, a fmall field-fort, built for the defence of fome pafs, or other pafs. See the article FORT.

SCONE, or SCOON, a town of Scotland, near Perth, remarkable for being the place where the kings of Scotland were crowned.

SCOPARIA, in botany, a genus of the tetrandria monogynia clafs of plants, the calyx of which is a fingle leafed, concave, perianthium, cut into four flender fegments; the corolla is a fingle, patent, concave petal, divided into four equal obtufe fegments; the fruit is an oblong, conic, acuminated capfule, formed of two valves, and containing only one cell, in which are lodged many oblong feeds.

SCOPER, or SCUPER-HOLES, in a fhip, are holes made through the fides, clofe to the deck, to carry off the water that comes from the pump. Thefe holes, in the lower deck, have round leathers nailed over them to keep the fea-water from coming up into the fhip; thefe are called fcoper-leathers, and the fhort-nails with broad heads, which faften thefe leathers down, are called fcoper-nails.

SCOPS, in ornithology, an extremely elegant fpecies of owl, about the fize of a field-fare, with the head aurited by two fingle feathers.

SCORBUTUS, the SCURVY, in medicine. See the article SCURVY.

SCORDIUM, WATER-GERMANDER, in botany, is comprehended by Linnæus among the teucriums. See TEUCRIUM. It is celebrated for its fudorific and alexipharmic virtues, and is accordingly prefcribed in malignant diforders: but it is never ufed alone, being only kept in the fhops as an ingredient of the confectio Fracaftorii, which takes its name of diafcordium from it. See DIASCORDIUM.

SCORE is fometimes ufed to denote the number twenty.

SCORE in mufic, denotes partition, or the original draught of the whole compofition, wherein the feveral parts, *viz.* treble, fecond treble, bafs, &c. are diftinctly fcored and marked. See the articles PARTITION and MUSIC.

SCORIA, or DROSS, among metallurgifts, is the recrements of metals in fufion; or, more determinately fpeaking, is that mafs which is produced by melting metals and ores, and when cold is brittle, and not diffoluble in water; being properly a kind of glafs.

Some authors call by this name that faline mafs which is produced by melting ores and metals together with faline and reducing fluxes. But the word *fcoria* is not properly to be underftood of all this mafs, but only of the vitrified particles which are lodged between, and adhere to the fmall maffes of the falts, and which may be feparated from them by water. See the next article.

SCORIFICATION, in metallurgy, is the art of reducing a body, either entirely, or in part, into fcoria.

It is ufed by metallurgifts, in order that any metal, imprifoned in any folid body, may, on account of its weight, defcend and feparate itfelf therefrom; and finally, if that be required, be either wholly or in part converted into fcoria. All fixed bodies are fubject to this alteration, not totally excepting even gold and filver. There are alfo, among the volatile bodies, fome that may be fixed, and which affume the name of fcoriæ, by adding fixed bodies to them.

It is often proper to make this fcorification in a veffel that may abforb the fcoriæ, and retain only the metallic part of the mafs under trial. In this cafe the operation is called coppeling; and veffels made of afhes, called tefts and coppels, ferve for this purpofe. It is evident, in thefe proceffes, that a great attenuation of the fcoriæ is neceffary, that they may be able to pafs through the veffel; nor is there any fitter body to promote this operation than lead, which, by its undergoing itfelf a like attenuation in the fire, difpofes other bodies to be reduced into a fubtile fcoria for the fame attenuation. See COPPEL and COPPELLING.

SCORPÆNA, in ichthyology, a genus of the acanthopterygious order of fifhes, the characters of which are thefe: the branchioftege-membrane, on each fide, contains feven bones: the head is large and very prickly: there is only one back-fin, and that is lower in the middle than elfewhere: the body grows fmall towards the tail: the eyes are placed near one another, and are covered with the common fkin: there are teeth in the jaws, palate, and fauces; and the appendices to the pylorus are eight or nine.

There are only two fpecies of this genus, *viz.* the fcorpæna with pinnules at the eyes

eyes and noftrils; which very much refembles the common pearch, and is alfo called fcorpio, and fcorpius minor; and the red fcorpæna, with numerous cirri, which is thrice the fize of the former fpecies.

SCORPIO, the SCORPION. See the next article.

SCORPION, *fcorpio*, in zoology, a genus of winglefs infects, the body of which is of an oval figure: the tail is long and flender, and the whole body covered with a firm and fomewhat hard fkin: the eyes are eight in number, two of which are placed contiguous, and fix fide-ways: the legs are eight; and there are alfo a pair of claws at the head, and a pointed weapon at the extremity of the tail. See pl. CCXL. fig. 4. n° 3. which reprefents the great yellowifh barbary fcorpion, with eight denticulations; and when full grown, meafures fix or feven inches in length: there are feveral other fpecies.

SCORPION, *fcorpio*, in aftronomy, the eighth fign of the zodiac, denoted by the character ♏. See SIGN and ZODIAC.

The ftars in the conftellation fcorpio, in Ptolemy's catalogue, are 20: in Tycho's 10: and in Mr. Flamfted's 49.

SCORPION, in the antient art of war, an engine chiefly ufed in the defence of the walls of fortified places, by throwing arrows, fire-balls, or great ftones. See plate CCXL. where fig. 4. n° 1. reprefents one of thefe machines charged, and n° 2. one in its natural fituation; the point A of the longeft brachium, A C, is kept uppermoft by the boxes of ftones B B: hence, in order to charge it, the point A being brought down by the rope R R, and loop *a*, drawn by means of the wheel W, and pinion at I, round the rollers L M, is detained by the pin H H. Then the loop *a* being taken off from A, and the fling S charged with the ball or ftone T, the fcorpion is ready to be difcharged; which is done by a fmart blow of an hammer on the end of the pin H H, or by fuddenly pulling it out by a rope; for then the point A rifes with great velocity, and one of the loops of the fling flipping off, the ftone T flies out, as reprefented in n° 2. which is another fcorpion, differing a little from that reprefented in n° 1; the difcharging end, A, being nearer to the axis of motion, D D, in the former than in the latter: in both, the fcorpion turns upon the pivot C; as the whole frame H I turns round the upright fhaft C *c*, that the machine may be directed any way. The hook H, in n° 2. does the office of the pin H in n° 1.

It appears, from Cæfar's Commentaries, that the Romans had great numbers of fcorpions in their camps: but however powerful thefe machines were, and however numerous, yet they are not to be compared with a battery of cannon, either for force or expedition.

Thofe who defire a more particular account of this machine, may confult Defaguliers's Experim. Phil. vol. i. p. 72 and 73.

SCORPIURUS, ROUGH-CATERPILLARS, in botany, a genus of the diadelphia-decandria clafs of plants, with a papilionaceous flower; and its fruit is a contorted pod, fomewhat refembling a caterpillar.

This genus comprehends the fcorpioides and campoides of authors.

SCORZONERA, VIPER'S-GRASS, in botany, a genus of the fyngenefia-polygamia-æqualis clafs of plants, with a compound imbricated flower, made up of a great many monopetalous, ligulated, and quinquedentated fmall ones: the ftamina are five very fhort capillary filaments: there is no pericarpium, except the imbricated cup, which becomes connivent, and contains a fingle oblong and ftriated feed after each leffer flower: the feeds are crowned with a plumofe down. See plate CCXLII. fig. 2.

The roots of this plant abound with a milky juice, of a bitterifh fubacrid tafte; and hence may be of fome fervice for ftrengthening the tone of the vifcera, and promoting the fluid fecretions. They were formerly celebrated as alexipharmics, and for expelling the meafles and fmall-pox; but have, of late, almoft loft their character in thefe intentions.

SCOT, *fcotta*, a cuftomary contribution laid upon all fubjects according to their abilities. Whoever were affeffed to any contribution, though not by equal portions, were faid to pay fcot and lot. See the article LOT.

SCOTIA, in architecture, a femicircular cavity or channel between the tores, in the bafes of columns. See the articles COLUMN and BASE.

The Scotia has an effect juft oppofite to that of the quarter-round. Our workmen frequently call it the cafement.

It is alfo called trochilus, partly from its form. See TROCHILUS, &c.

In the ionic and corinthian bafe, there

are two scotias, the upper whereof is the smaller. See IONIC and CORINTHIAN. According to Felibien, the cavetto is a fourth part of the scotia. See the article CAVETTO.

SCOTISTS, a sect of school-divines and philosophers, thus called from their founder J. Duns Scotus, a Scotish, or as others say, an Irish cordelier, who maintained the immaculate conception of the virgin, or that she was born without original sin, in opposition to Thomas Aquinas and the Thomists. See THOMISM. As to philosophy, the Scotists were like the Thomists, only distinguished by this, that in each being, as many different qualities as it had, so many different formalities did they distinguish, all distinct from the body itself, and making as it were so many different entities, only those metaphysical, and as it were superadded to the being.

SCOTLAND, exclusive of the islands, is situated between 1° and 6° west long. and between 54° 30′ and 58° 30′ north lat. being about three hundred miles long, from north to south, and from fifty to one hundred and fifty miles broad, from east to west.

Since the union with England, Scotland is divided into thirty-three shires, or counties, which altogether send only thirty knights to parliament, by reason the shires of Bute and Cathness choose only alternately, or every other parliament, in their turns; as do those of Cromarty and Nairn, Clackmannan and Kinross.

The royal boroughs of Scotland are sixty-five, but so classed as to send only fifteen burgesses to parliament.

*New* SCOTLAND, *Nova Scotia*, one of the british colonies in North America, is situated between 62° and 72° west long. and between 43° and 51° north lat. being bounded by the river of St. Laurence on the north and north-west; by the bay of St. Laurence, and the Atlantic Ocean on the east; by the same ocean and New-England on the south; and by Canada on the west.

SCOTOMIA, or SCOTOMA, in medicine, a dizziness or swimming in the head, wherein the animal spirits are so whirled about, that external objects seem to turn round. See the article VERTIGO.

SCRATCH, in the language of the salt-workers of our country, the name of a calcarious, earthy, or stony substance, which separates from sea-water in boiling it for salt. This forms a thick crust, in a few days, on the sides and bottoms of the pans, which they are forced to be at the pains of taking off once in a week, or ten days, otherwise the pans burn away and are destroyed. See the article SALT.

SCRATCH-PANS, in the English salt-works, a name given to certain leaden pans, which are usually made about a foot and half long, a foot broad, and three inches deep, and have a bow, or circular handle of iron, by which they may be drawn out with a hook, when the liquor in the pan is boiling. See SALT. The use of these pans is to receive a calcarious earth, of the nature of that which incrusts our tea-kettles, which separates from the water in boiling; this substance they call scratch; and these pans, being placed at the corners of the salt-pan, where the heat is least violent, catch it as it subsides there.

SCRATCH-WORK, *sgraffiata*, a way of painting in fresco, by preparing a black ground, on which is laid a white plaister, which white being taken off with an iron bodkin, the black appears through the holes, and serves for shadows. See the article SGRAFFIT.

This kind of work is lasting, but, being very rough, is unpleasant to the sight.

SCRATCHES, among farriers, a distemper incident to horses, consisting of dry scabs, chops, or rifts, that breed between the heel and the pastern-joint. There are various kinds of scratches, distinguished by various names, as crepances, rats tails, mules, kibes, pains, &c. which are all so many species of the same malady, engendered from some dry humour falling on the legs, or from the fumes of the beasts own dung lying under his heels, especially after a journey from over-hard riding, &c. This disorder begins first with dry scabs in the pastern joint in several forms. It is known by the staring, dividing and curling of the hair on the spot.

SCREW, or SCRUE, *cochlea*, one of the five mechanical powers. A screw is a cylinder cut into several concave surfaces, or rather a channel or groove made in a cylinder, by carrying on two spiral planes the whole length of the screw, in such a manner, that they may be always equally inclined to the axis of the cylinder in their whole progress, and also always inclined

inclined to the base of it in the same angle.

The screw may also be considered as a wedge carried round a cylinder, which in that case is called the arbor of the screw; the wedge, so carried on, making what is called the thread of the screw, as may be seen in plate CCXLII. fig. 1. n° 1, 2, 3, 4, and 5. The arbor of the screw being A B in n° 1. and *a c b d* in n° 2. as if the cylinder A C B D was inscribed within the screw. Here, we may see the manner how a screw is made; for if it be cut out of the cylinder P H I Q, then H K L M N O P is a spiral line going about the cylinder, making the prominent part to be left of the said cylinder; and *h k l m n o*, the line marking the depth to which the screw is to be cut, supposing the same line to go round the inner cylinder or arbor A B C D, though not expressed here, to avoid confusion; and then *b* L *l* N *n*, &c. will represent the prominent part or thread of the screw. Now, if instead of cutting the hollows H*b*L, L*l*N, N*n*P, *&c.* into the cylinder P H I Q, a continued wedge be fixed to a smaller cylinder as A C B D, or rather *a c b d*, the same kind of screw will be made, and *a b c d* will be the arbor of that screw. Sometimes the most prominent part of the thread, as L N, *&c.* is not sharp but flat, and then the thread is called a square thread, as in (n° 5.) which represents the section of such a screw. This sort of thread is not used in wood, but in iron, and in other metals; it is of good service, being commonly more durable, and raising the weight with more ease than the sharp thread.

*Force of the* SCREW. To make an estimate of the force of the screw, which may be compared either to an inclined plane, or to a wedge, according as its arbor does or does not advance in a progressive motion whilst it turns round its axis to raise or stop a weight, or to press bodies together, which are the several uses of a screw, let us take a flexible wedge, as, for example, one of paper, and coil it round a cylinder, (*ibid.* n° 1.) as is represented in the figure, where A B is the arbor, C I D one thread or helix, D H E another, and E T G part of the wedge left to shew the proportion between the power that turns the screw and the weight W.

If the weight is pushed up the wedge, (or, which is the same thing, raised perpendicularly by the wedge slipping under it) from F to H in the direction W *w*, then will H G be the velocity of the weight, and G T the velocity of the power, which is the case of the inclined plane becoming a wedge; and this will be the analogy for the screw thus acting. As a circle whose diameter is H *h* : to H I the distance of two threads :: (or as the base F G : to the perpendicular H G :: ) so is the weight : to the power applied to the arbor at A, to raise a weight up the thread H D I C.

*N. B.* We suppose the diameter of the arbor at A and of the screw at H nearly equal.

This is the case of n° 4. where the moveable plank D K is carried down, by turning round the heads G G of the screws A B and C D, in order to press strongly the bodies placed between the planks D K and M L, whilst the piece H I, fixed on the upper plank, is either guided through an hole, or, being only looked at, serves to shew whether the plank K D be brought down horizontally, as the screws are turned. When long levers are thrust into the square holes at the heads of the screws, the force of the screws is much increased, and then the weight will be to the power :: as the circumference of the circle described by that part of the lever to which the hand is applied : to the distance between two threads. Wherefore, as the circumference of the circle is to the distance of two thirds of an endless screw :: so is the resistance of the teeth of the wheel : to the power applied to the handle.

*Archimedes*'s SCREW, in hydraulics, a kind of spiral pump, for raising water, so called from its inventor Archimedes.

It consists of a long cylinder, with a hollow pipe, tube, or groove coiled round it, as represented in *ibid.* n° 7. where A B represents the cylinder, and C D the tube open at each end. It is placed in an oblique position to the horizon, with the lower end in the water to be pumped away, the other end being supported on the lower part of the winch I K, by which the screw and cylinder are turned round.

As soon as the scew is immersed in the water, it immediately rises therein by the orifice C to the level of the surface of the water E F; and if the point of the helix or spiral, which in the beginning of the motion is coincident with the surface of the water, happens not to be on the lower side of the cylinder, the water will

will upon the motion of the fcrew, move on in the fpiral, till it comes to the point which is on the other fide, and co-incident with the furface of the water; when it is arrived at that point, which fuppofe at O, it cannot afterwards poffefs any other part of the fpiral than that which is upon the loweft part of the cylinder; for it cannot move from O towards H or G, becaufe they are fituated higher above the horizon; and fince this will conftantly be the cafe, after the water in the fpiral has attained the point O, it is plain that it muft always be on the under fide of the cylinder.

But becaufe the cylinder is in motion, every part of the fpiral-fcrew, from O to D, will, by degrees, fucceed to the faid under part of the cylinder; the water, therefore, in the fpiral, muft fucceed to every part thereof, from O to D, as it comes on the lower fide; that is, it muft afcend on the lower part of the cylinder through all the length of the pipe, till it comes to the orifice D, where it will run out, as having nothing farther to fupport it. Hence it appears how much thofe gentlemen are miftaken who, affecting the wonderful, fay, 'That the water 'afcends by defcending;' whereas, if they would have made the moft of the wonder, they might have truly faid, 'That the water afcends becaufe it can-'not afcend,' *i. e.* that it afcends one way, becaufe it cannot afcend another; but then the wonder is loft.

*Endlefs or perpetual*-SCREW, one fo fitted in a compound machine, as to turn a dental wheel; fo called, becaufe it may be turned for ever without coming to an end: *ibid.* n° 6.

If in the endlefs, or perpetual-fcrew, AB, whofe threads take the teeth of the wheel CD, you take the diftance of two threads, according to the length of the axis AB; or the diftance of two teeth in the wheel CD, in the direction of the circumference; and if a weight, W, act at the circumference of the wheel: then, if the power D be to the weight W, as that diftance of the teeth or threads, to the length defcribed by the power P in one revolution, the power and weight will be in æquilibrio; becaufe in one revolution of P, the wheel DC, with the weight W, has moved only the diftance of one tooth.

SCRIBE, an officer among the Jews whofe bufinefs was to write; of which there were three kinds: the firft and principal of which were the fcribes of the law, whofe office was to write and interpret fcripture; thefe were in great credit and efteem among the Jews, and had even the precedency of the priefts and facrificers, and their decifions were received with almoft the fame refpect as the law of God itfelf: the fecond kind, properly called fcribes of the people, were a fort of magiftrates: and the third were public notaries, or fecretaries of the council; which were the leaft confiderable.

The fcribes, among the Romans, wrote out decrees, or acts, and made out autentic copies of them.

SCRIBING, in joinery, *&c.* is a term ufed when one fide of a piece of ftuff is to be fitted to another that is irregular. In order to make thefe join clofe all the way they fcribe it; that is, they lay the piece to be fcribed clofe to the other they intend to fcribe it to, and opening their compaffes to the wideft diftance thefe two pieces ftand from each other, they bear the point of one of the legs againft the fide they intend to fcribe to, and with the other point draw a line on the ftuff to be fcribed. Thus they form a line on the irregular piece parallel to the edge of the irregular one; and if the ftuff be cut exactly to the line, when thefe pieces are put together they will feem a joint.

SCRIPTURE, an appellation given, by way of eminence, to the facred and infpired writings of the Bible. See the articles BIBLE, CANONICAL, *&c.*

SCRIVAN, a port-town of the province of Darien, in Terra Firma, fifty miles eaft of Porto Bello.

SCROPHULA, the KING'S EVIL, in medicine, a hard glandulous humour, ufually of the fame colour with the fkin, feated principally in the fides of the neck, behind the ears, and under the chin: but though the principal feat of this difeafe is in the fides of the neck, fcarcely any part of the body is exempted from it. The humour fometimes falls on the lungs, and brings on a pulmonary confumption; and it is a dreadful circumftance, that this diforder is tranfmitted from parents to their children, by way of inheritance. As to the cure of this ftubborn difeafe, fays Dr. Mead, it is to be attempted by bleeding, purging and fuch medicines as are moft proper for correcting the vifcidity, faltnefs, and acrimony of the humours. Of cathartics, the beft is dulcified

fied mercury fix times fublimed, which fhould be joined with rhubarb, for children; but to adults it may be given alone, with a gentle purging draught fome hours after it. The next to this in virtue is jalap: and our purging waters are alfo ufeful, as they fcour the glands and open the body at the fame time. In fine, a pill compofed of mercury fix times fublimed, and precipitated fulphur of antimony, each one grain; of aloes, three or four grains; made up with the fyrup of balfam, and taken every night, will be found ferviceable, not only in this difeafe, but in others arifing from vifcid humours.

For correcting this depravity of blood and humours, the following powder may be taken twice a day, with three or four glaffes of the lefs compound lime-water: take of burnt fpunge, one fcruple; of purified nitre, coralline, and white fugar, each ten grains; mix them together: and if the patient happen to be emaciated, equal quantities of milk may be mixed with the water. The expreffed juice of millepedes will alfo be of fome fervice, on account of their diuretic quality. Iffues likewife will be beneficial, to drain off the vifcous humour; and a change of aliment is often attended with good effects.

As to the patient's diet, which ought not to be neglected, let him feed on flefh of eafy digeftion, and abftain from all falt and fmoke-dried meat and high-feafoned things; and particularly from pork, hare, cheefe, and in general from all things that are hard of digeftion. Let him drink river-water, and that boiled; but ftagnating or fnow-water never.

For the manner of treating fcrophulous tumours, by outward applications, fee the article SCIRRHUS.

SCROPHULARIA, FIGWORT, in botany, a genus of the didynamia-angiofpermia clafs of plants, with a monopetalous flower, divided into five fegments at the limb: the fruit is a roundifh bilocular capfule, containing a great many fmall feeds.

The root of this plant is efteemed externally, as a remedy for the piles, and for the king's evil-fores: it is generally made into an ointment for thefe purpofes; for fome give it alfo internally, in diet-drinks.

SCROTUM, in anatomy, the capfula or bag in which the tefticles are contained, and which hangs down below the penis. See the article TESTICLE.

The fcrotum is compofed of a cuticula, cutis, and a mufculous membrane called the dartus, by means of which it is contracted. It has in the midft a feptum, formed by a duplicature of the dartus, by which it is divided into two cells, and which anfwers to a longitudinal future, by which it is externally divided into two fides, a right and a left. It has its veffels from the hypogaftrics, and its nerves from the os facrum.

Its ufe is to contain, to cherifh, and defend the tefticles.

SCROTUM CORDIS, the fame with pericardium. See PERICARDIUM.

SCROWLS, or SCROLLS, in architecture, the fame with volutes. See VOLUTE.

SCRUPI, in natural hiftory, a clafs of foffils, formed into large detached maffes without crufts, and compofed of a varioufly debafed cryftalline matter. Of this clafs there are two orders, and under thefe four genera, *viz.* the firft order comprehend thofe fcrupi, of a more rude and irregular ftructure in the mafs, as the telaugia; and the fecond order comprehends thofe of a more equal and regular conftitution, as the petridia and the jafpides. See TELAUGIA, *&c.*

SCRUPLE, a weight equal to the third part of a dram, or to twenty grains. See the article WEIGHT.

Among goldfmiths it is equal to twenty-four grains.

The fcruples of the moon, *&c.* eclipfed, are the parts of the moon's diameter immerfed in the fhadow, expreffed in the fame meafure wherein the apparent diameter of the moon is expreffed.

The fcruples of half duration are an arch of the moon's orbit, which the center of the moon defcribes, from the beginning of an eclipfe to its middle. Scruples of immerfion, are an arch which the moon's center defcribes, from the beginning of the eclipfe to its middle. And fcruples of emerfion, are an arch of the moon's orbit, defcribed by her center from the time of the emerfion of her limb to the end of her eclipfe. See ECLIPSE.

SCRUTINY, a ftrict examination of the feveral votes taken at an election, in order to difcover unqualified voters. See the article ELECTION.

SCULPTURE, an art by which, in taking away, or adding to matter, all forts of figures are formed by the hand, either in ftone, wood, wax, or metal. In its full latitude it fignifies both the art of working in creux, properly called engraving, and

and of working in relievo, which is more ſtrictly called ſculpture. See the articles ENGRAVING and RELIEVO.

The firſt works in ſculpture were with clay, not only in making ſtatues, but in forming models; and to this day a ſculptor never undertakes any thing conſiderable, without forming a model, either in clay or wax. In making figures of theſe materials, they begin and finiſh their work with their hands, uſing only three or four pieces of wood, which are roundiſh at one end, and at the other flat, with a ſort of claws and teeth, which are to ſmooth and ſcratch the work. For waxen models, to every pound of wax add half a pound colophony; ſome add turpentine, and melt it together with oil of olives; more or leſs of the latter being uſed as they would have the matter harder or ſofter: ſome alſo add a little vermillion, to give it a colour: this is wrought and moulded with the fingers like clay. See the article MOULDING.

For ſculpture in wood, which we properly call carving, the firſt thing required is to chooſe wood proper for the work the ſculptor is to perform. If it be any thing large, and that requires a great deal of ſtrength and ſolidity, the hardeſt and moſt durable wood is to be choſen; and for ſmaller works and ornaments, the ſofter wood is uſed; but it muſt be ſuch, however, as is firm and cloſe: for a large work, though it be only a ſingle figure, it is better to make uſe of ſeveral pieces of wood, or bits of board, glued together, than of one whole piece, which is more liable to crack; for a thick piece of wood may not be dried to the heart, however it may appear on the outſide. Carving is performed with a great variety of chiſſels and other tools, for paring, ſcooping, rounding, *&c.* the ſeveral parts of the work, ſee *Cutting in* WOOD.

In ſculpture in marble and other ſtone, the firſt thing to be done is to ſaw out a block of marble, of the bigneſs of the work to be performed; and this being done, the ſuperfluities are to be taken off by a ſtubbed point and a heavy mallet; thus, bringing it near the meaſures required, the ſculptor reduces it ſtill nearer with a finer tool, called a dog's tooth, it having two points, but one not ſo ſharp as the other. After this he makes uſe of his gradine, which is a flat cutting tool, with three teeth; he then takes off, with a ſmooth chiſſel, the ſcratches the gradine left on the marble, and uſes it with dexterity and delicacy, to give ſoftneſs and tenderneſs to his figure; till at length, taking raſps of different degrees of fineneſs, the work is gradually rendered fit for poliſhing. To poliſh the work, the ſculptor uſes pumice-ſtone and ſmalt, then he goes over it with tripoli; and when he would give it more luſtre, rubs it with leather and ſtraw-aſhes. There are ſeveral other tools uſed by ſculptors, adapted to the different parts of the work, and the nature of the ſtone they make uſe of. As the models of clay ſhrink as they grow dry, whenever ſculptors undertake a conſiderable piece of work, they only uſe the model for making a mould of plaiſter or ſtucco, in which is formed a figure of the ſame matter, which ſerves them thenceforth for a model, and by which they adjuſt all their meaſures and proportions. To proceed the more regularly, on the head of the model they place an immoveable circle divided into degrees, with a moveable rule or index, fixed in the center of the circle, and divided alſo into equal parts: from the end of the rule hangs a line with a plummet, which ſerves to take all the points, to be tranſferred thence to the block of marble, from whoſe top hangs another plummet, like that of the model. But there are ſome excellent ſculptors, who diſapprove of this method; urging, that the ſmalleſt motion of the model changes their meaſures, for which reaſon they chooſe rather to take all their meaſures with the compaſſes. See the articles POLISHING, *&c.*

SCUM, properly denotes the impurities, which a liquor, by boiling, caſts up to the ſurface. See CLARIFICATION.

The term ſcum is alſo uſed for what is more properly called the ſcoria of metals. See the article SCORIA.

In this laſt ſenſe, the ſcum of lead is a ſort of ſmalt, of various colours; and the ſcum of ſilver is commonly what we call litharge. See SMALT and LITHARGE.

SCUPER, or SCOPER-HOLES, in a ſhip. See the article SCOPER.

SCURRA, in ornithology, the name by which the antients called the jackdaw.

SCURRULA, in botany, a genus of the tetrandria monogynia claſs of plants, without any calyx; the corolla is monopetalous, tubulous, and ſemiquadrifid; the fruit is a turbinated berry, roundiſh at top; the ſeed is not deſcribed.

SCURVY, *ſcorbutus*, in medicine, Dr. Mead obſerves, is the name given by medical

dical writers to a disease so various and different in appearance, that it does not seem to be one and the same distemper.

Boerhaave observes that the scurvy chiefly affects the inhabitants of cold northern countries, especially those who live in marshy, low, fat, and moist soils, near stagnating waters, whether fresh or salt. Those who live idle sedentary lives are most subject, chiefly in the winter-time, to the attacks of this distemper; as also those feeding upon salted and smoke-dried flesh, or fish, sea-biscuit, stinking water, unfermented farinaceous vegetables, peas, beans, sharp, salt, old cheese; likewise those who are subject to melancholic, maniacal, hysteric, or hypochondriacal disorders; or those who have taken large quantities of the peruvian bark without proper evacuations. Dr. Pringle considers the scurvy as arising from a putrid cause only; and thinks that the species of that malady, said to be owing to an acid, is so far from being so, that it were to be wished this supposed species of scurvy had not been denominated of this distemper, and the more so, as he apprehends that in the countries most liable to the true scurvy, an acid is rarely to be blamed. He thinks, that if the acrimony of the fluids is great and sudden, a fever or flux will ensue; but if the accummulation is so slow, that the body grows habituated to the putrefaction, a scurvy prevails; this is the case in long voyages, occasioned by corrupted air and provisions, on board unventilated ships, in marshy countries from similar causes, and in a lesser degree in all northerly climates in most situations, from a want of due perspiration of what is putrid, and especially with the use of salted meats.

The scurvy, according to Sydenham, is known by a spontaneous wearinefs, a heavinefs of the body, difficulty of breathing especially after motion, rottennefs of the gums, a stinking breath, frequent bleeding of the nose, difficulty of walking, sometimes a swelling and sometimes a falling away of the legs, in which there are always livid, plumbeous, yellow, or violet-coloured spots, and the colour of the face is generally of a pale tawney.

Boerhaave observes, that the first state of this disease begins with unusual lazinefs, spontaneous wearinefs; the patient loves to be in a sitting or lying posture; there is a pain in all the muscles as if he was over-tired, especially in the legs and loins; when he awakens in the morning, all his joints and muscles seem to be tired and bruised. In the second state, the gums swell, grow painful, hot, and itching, and bleed upon the least pressure: the roots of the teeth become bare and loose; he feels pains in all the external and internal parts of the body imitating distempers proper to the various parts. In the third state, the gums at length grow putrid, with a cadaverous smell: when they are inflamed, blood distils from them, and a gangrene ensues; the loose teeth by degrees grow yellow, black, and rotten; the sublinguar veins become varicose and like rings; there are often fatal hæmorrhages, which break out from the external skin, without any appearance of a wound, from the lips, gums, mouth, nose, lungs, stomach, liver, spleen, pancreas, intestines, womb, kidneys, *&c.* Obstinate ulcers arise, which no application will cure, and are apt to turn to a gangrene; they break out in all parts of the body, but especially the legs, and are attended with a stench; there is a kind of itch and dry scabs, with a dry and mild leprosy; the blood drawn from a vein is black and grumous, thick, and yet wants its due consistence in the fibrous part; the serum is salt, sharp, and abounding with a yellowish green mucus on the surface: there are gnawing rending pains, quickly shifting from place to place, which grow more violent in the night, affecting all the joints, bones, and viscera. In the fourth state there are fevers of various kinds, which bring on an atrophy; sometimes diarrhæas, dysenteries, or violent stranguries; as also faintings and mortal anxieties, a dropsy consumption, convulsions, trembling, a palsy, contractions, black spots, voiding of blood upwards and downwards, a putrefaction and consumption of the liver, spleen, pancreas, mesentery: and now the contagion spreads very thick.

From this account of the disease it appears, continues the last-mentioned author, that one part of the blood is faulty in being too thick, and the other in being too thin, with a salt alkaline, or acid acrimony; wherefore, to discover which of the three predominates, requires the utmost attention, and the most accurate enquiry: for, in the cure of this disease, that which is thick is to be attenuated, that which is stagnant rendered moveable, and that which is coagulated is to be made fluid.

It ought to be laid down, ſays Hoffman, as a general rule, that the ſcurvy, the moſt virulent of all chronical diſtempers, is not to be treated with draſtic, but with the moſt mild and ſimple medicines: likewiſe the patient ſhould change the air in which the diſeaſe is formed, and remove from unhealthy places, where the air is impure, vapid, and deprived of its due elaſticity, cloudy, or impregnated with noxious exhalations, to places more ſalutary, and where the air is more pure. If his circumſtances will not admit of travelling to Italy or France for a purer air, he ſhould burn juniper-wood in his chimney, or throw amber on live coals. The patient ſhould alſo uſe exerciſe, not indulging himſelf in much ſleep, be temperate in his diet, and feed upon aliment of eaſy digeſtion. Our author ventures to affirm, that mineral waters are a univerſal remedy for the ſcurvy; but the cure is ſtill more certain, if an acurate regimen be obſerved, and the waters aſſiſted by the repeated exhibition of proper antiſcorbutic and balſamic medicines. When theſe cannot be had, pure light fountain-water, wherein hot iron has been extinguiſhed, may be ſubſtituted in their room. Beſides mineral waters, nothing is more effectual in correcting a ſcorbutic acrimony than a milk-diet, or whey, or whey impregnated with the juices of antiſcorbutic herbs, as ſcurvy-graſs and water-creſſes. Scurvy-graſs and all the ſpecies of garden and water-creſſes, horſe-radiſh, the roots of wild radiſh, and muſtard are juſtly looked upon as antiſcorbutics, for they induce a ſurpriſing change both in the diſordered fluids and ſolids. To theſe may be added the roots of gentian and ſuccory, the leaves of ſcordium, carduus benedictus, worm-wood, the leſſer centaury, water-trefoil, or bucks-beans. Balſamics and corroboratives, as juniper-berries, the tops of fir and pine-trees, winters bark, cortex elutheriæ, and the peruvian bark: the gums ammoniac, ſagapenum, and galbanum; and the woods of ſaſſafras, guaiacum, and aloes. Medicines which allay the pains and ſpaſms, are the fat of animals, cream, oil of ſweet almonds, ſperma ceti, caſtor, aſſa fœtida, extracts of yarrow and camomile, diaſcordium, ſaffron, earth-worms, elk-hoof, &c. As to evacuations, bleeding ſhould be uſed with the greateſt caution; and none but the gentleſt purges ſhould be uſed, ſuch as ſena, rhubarb, or manna; alſo pills made after the manner of Becher, with depurated aloes, extract of rhubarb, bitter herbs, and temperate balſamic ingredients. The diuretics ſhould not be ſtronger than the decoction of the roots of parſley, celeri, fennel, and aſparagus. The ſafeſt diaphoretics are dulcified ſpirit of nitre, flowers of ſulphur, æthiops mineral, infuſions in the manner of tea of Paul's betony, carduus benedictus, ſcordium, and elder-flowers, diaphoretic antimony, calcined and uncalcined hartſhorn, amber, native cinnabar, cinnabar of antimony, and compound powder of crab's claws: theſe things are adapted to a cold ſcurvy. But in the hot or alcaline, ſcurvy-graſs is too hot to be adminiſtered alone; wherefore it ſhould be corrected with acids, ſuch as wood-ſorrel, the juices of citrons, oranges, barberries, and pomegranates; this ſhould be accompanied with milk-meats, almond emulſions, barley-broths, water-gruel, chicken-broths, with endive, lettuce, ſorrel, and creſſes, at intervals. When the ſcurvy proceeds from muriatic ſalts, which happens to thoſe who live on ſmoked or high-ſalted fiſh or fleſh, then whey, copiouſly drank, produces good effects; as alſo citrons, china-oranges, and ripe fruits; whereas ſpirituous and volatile antiſcorbutics are generally detrimental. Heiſter ſays, that when there is a continual ſalt taſte in the mouth, lime-water, drank morning and evening, is a high ſpecific. The late biſhop of Cloyne ſays, that if he may truſt what trials he has been able to make, tar-water is good in the ſeveral ſorts of ſcurvy, whether alkaline, acid, or muriatic; and that he believes it to be the only medicine that cures them all, without doing hurt in any. See the article TAR.

In a high degree of the ſcurvy, mercurial ſalivation is looked upon by many as the only cure; which by the vehement ſhock it gives the whole frame, and the ſenſible ſecretion it produces, may be thought to be more adequate to ſuch an effect; but the diſorder occaſioned by that violent proceſs, it is to be feared, may never be got over. See SALIVATION.

SCURVY GRASS, *cochlearia*, in botany. See the article COCHLEARIA.

SCUTAGE, was antiently a tax impoſed on ſuch as held lands, &c. by knight's ſervice, towards furniſhing the king's army: hence ſcutagio habendo was a writ that lay for the king, or other lord, againſt tenants holding by knight's ſervice, to ſerve in perſon, or ſend a ſuffi-

cient

cient man in their room, or pay a certain sum, &c.

SCUTARET, or SCUTARI, a castle and seraglio on the east side of the Bosphorus, opposite to Constantinople, about a mile from it.

SCUTARI, a city of european Turky, in the province of Albania, situated in east longit. 20°, and north lat. 42° 30'.

SCUTCHEON. See ESCUTCHEON.

SCUTELLARIA, in botany, a genus of the didynamia-gymnospermia class of plants, the corolla whereof consists of a single ringent petal; the tube is very short, and reflected backwards; the faux is long and compressed; the upper lip is concave and trifid, and the middle lacinula concave and emarginated; there is no pericarpium; the mouth of the calyx is originally open, but after the flower is fallen it becomes shut, with an operculum; the seeds are roundish, and four in number. This genus comprehends the cassida of Tournefort.

This plant is recommended as good in tertian agues.

SCUTIFORME OS, in anatomy, the chief bone of the knee, called also patella, mola, &c. See the article PATELLA.

SCUTIFORMIS CARTILAGO, in anatomy, one of the cartilages of the larynx, the broadest and biggest of them all, called also thyroides. See the article LARYNX. This cartilage is of a quadrangular figure, and stands in the anterior part, where the pomum Adami makes its prominence, whence it is sometimes called the anterior cartilage. It is gibbous withoutside, and hollow within; sometimes double, chiefly in women, in whom it does not advance so far forward as in men.

SCUTTLES, in a ship, square holes cut in the deck, big enough to let in the body of a man, serving to let people down into any room below upon occasion, or from one deck to another. They are generally before the main-mast, before the knight in the forecastle; in the gun-room, to go down to the stern sheets; in the round-house, to go down into the captain's cabin, when forced by the enemy in a fight aloft. There are also some smaller scuttles, which have gratings over them: and all of them have covers, that people may not fall down through them in the night.

Scuttle is also name given to those little windows and long holes which are cut out in cabins, to let in light.

SCYTALA, in mechanics, a term used by some writers, for a kind of radius, or spoke, standing out from the axis of a machine, as an handle or lever to turn it round and work it by.

SCYTALA LACONICA, a stratagem or device of the Lacedemonians, for the secret writing of letters to their correspondents, so that if they should chance to be intercepted, no body might be able to read them. To this end they had two wooden rollers or cylinders, perfectly alike and equal, one whereof was kept in the city, and another by the person to whom the letter was directed. For the letter, a skin of a very thin parchment was wrapped round the roller, and thereon was the matter written; which done, it was taken off, and sent away to the party, who, upon putting it in the same manner upon his roller, found the lines and words in the very same disposition as when they were first written.

SCYTHIA. The northern parts of Europe and Asia were anciently so called, which afterwards obtained the name of Tartary.

SEA, *mare*, is frequently used for that vast tract of water encompassing the whole earth; but is more properly a part or division of these waters, and is better defined a lesser assemblage of water, which lieth before and washeth the coasts of some particular countries, from whence it is generally denominated, as the Irish sea, the Mediterranean sea, the Arabian sea, &c.

What proportion the superficies of the sea bears to that of the land is not precisely known, though it is said to be somewhat more than two thirds. As the waters of the earth must necessarily rise to the surface thereof, as being specifically lighter than the earth, it was necessary there should be large cavities therein for receptacles to contain them, otherwise they would have overspread all the superficies of the earth, and so have rendered it utterly uninhabitable for terrestrial animals; for the center of the earth being the common center of gravity, and the nature of fluids being such, that they equally yield to equal powers; and the power of attraction being every where equal at equal distances from the center, it follows, that the superficial parts of the water will every where conform themselves to an equidistant situation from the center, and consequently will form the surface of a sphere, so far as they extend. Hence, that the sea seems higher than the earth

earth or land, refults from the fallacy of vifion, whereby all objects, and the parts of land as well as fea, the farther they are off from us, the higher they appear; the reafon of all which is plain from optics: for it is well known, that the denfer any medium is, through which we behold objects, the greater is the refraction; or the more their images appear above the horizontal level; alfo the greater quantity of the medium the rays pafs through, the more will they be bent from their firft direction; on both thefe accounts the appearances of things remote, and on the fea, will be fomewhat above the horizon, and the more fo, as they are the more remote. See the articles GRAVITY, FLUID, EARTH, REFRACTION, &c.

With regard to the depth or profundity of the fea, Varenius affirms, that it is in fome places unfathomable, and in other places very various, being in certain places $\frac{1}{20}$, $\frac{1}{5}$, $\frac{45}{100}$, $1\frac{1}{10}$, $2\frac{2}{10}$, $4\frac{1}{2}$ englifh miles, in other places deeper, and much lefs in bays than in oceans. In general, the depths of the fea bear a great analogy to the height of mountains on the land, fo far as is hitherto difcovered. See the article MOUNTAIN.

M. Daffie has been at great pains to prove that the fea has a general motion, independent of winds and tides, and of more confequence in navigation than is generally fuppofed. He affirms, that this motion is from eaft to weft inclining towards the north, when the fun has paffed the equinoctial northward, and that during the time the fun is in the northern figns; but the contrary way after the fun has paffed the faid equinoctial fouthward: adding, that when this general motion is changed, the diurnal flux is changed alfo; whence it happens that in feveral places the tides come in, during one part of the year, and go out during the other, as on the coafts of Norway, in the Indies at Goa, Conchinchina, &c. where, while the fun is in the fummer figns, the fea runs to the fhore; and when in the winter figns, runs from it. On the moft fouthern coafts of Tonquin and China, for the fix fummer months, the diurnal courfe runs from the north with the ocean; but the fun having repaffed the line toward the fouth, the courfe declines alfo fouthward.

There are two principal reafons why the fea doth not increafe by means of rivers, &c. falling every where into it. The firft is, becaufe waters return from the fea by fubterranean cavities and aqueducts, through various parts of the earth. Secondly, becaufe the quantity of vapours raifed from the fea, and falling on the land, only caufe a circulation, but no increafe of water. It hath been found by calculation, that in a fummer's day there may be raifed in vapours, from the Mediterranean fea 5280000000 tuns of water; and yet this fea receiveth not, from all its nine great rivers, above 1827000000 tuns per day, which is but a third part of what is exhaufted in vapours.

The afcent of the fea-water, for the formation of fprings, by a fubterranean circulation of its water to their fources, has been a great objection with many, againft the fyftem of their being formed of the fea; but Dr. Plot has obferved, that there are many ways by which the water may afcend above its own level: 1. By the means of fubterranean heats. 2. By filtration. 3. By the unequal height of feveral feas. 4. By the diftance of the center of magnitude from the center of gravity in the terraqueous globe: the fuperficies of the Pacific fea is faid to be farther from the center of gravity than the top of the higheft hill on the adverfe part of the globe. And 5. By the help of ftorms. The fea-water actually afcends above its own level, coming into wells, whofe bottoms lie higher than the furface of the fea at high-water mark.

With regard to the faltnefs of the fea-water, it is very rationally judged to arife from great multitudes both of mines and mountains of falt, difperfed here and there in the depths of the fea. The falt being continually diluted and diffolved by the water, the fea becomes impregnated with its particles throughout; and for this reafon the faltnefs of the fea can never be diminifhed. Dr. Halley fuppofes that it is probable the greateft part of the fea-falt, and of all falt-lakes, as the Cafpian fea, the Dead-fea, the lake of Mexico, and the Titicaca in Peru, is derived from the water of the rivers which they receive; and fince this fort of lakes has no exit or difcharge, but by the exhalation of vapours; and alfo fince thefe vapours are entirely frefh, or devoid of fuch particles, it is certain the faltnefs of the fea and fuch lakes muft, from time to time increafe, and therefore the faltnefs at this time is greater than at any time heretofore. He further adds, that if, by experiments made in different ages, we could

could find the different quantity of salt, which the same quantity of water (taken up in the same place, and in all other the same circumstances) would afford, it would be easy from thence, by rules of proportion, to find the age of the world very nearly, or the time wherein it has been acquiring its present saltness.

With regard to the use of this salt property of sea-water, it is observed that the saltness of the sea preserves its waters pure and sweet, which otherwise would corrupt and stink like a filthy lake, and consequently that none of myriads of creatures that now live therein, could then have a being. From thence also the sea-water becomes much heavier, and therefore ships of greater size and quantity may be used thereon. Salt water also doth not freeze so soon as fresh water, whence the seas are more free for navigation. We have lately had published a dissertation, by Dr. Russel, concerning the medical uses of sea-water, in diseases of the glands, *&c.* wherein the author premises some observations upon the nature of sea-water, considered as impregnated with particles of all the bodies it passes over, such as submarine plants, fish, salts, minerals, *&c.* and saturated with their several effluvia, to enrich it, and keep it from putrefaction; hence this fluid is supposed to contract a soapiness, and the whole collection being pervaded by the sulphureous steams passing through it, to constitute what we call sea-water, the confessed distinguishing characteristics of which are saltness, bitterness, nitrosity, and unctuosity: whence the author concludes, that it may be justly expected to contribute signally to the improvement of physic. The cases in which our author informs us we are to expect advantage from sea-water, are, 1. In all recent obstructions of the glands of the intestines and mesentery. 2. All recent obstructions of the pulmonary glands, and those of the viscera, which frequently produce consumptions. 3. All recent glandular swellings of the neck, or other parts. 4. Recent tumours of the joints, if they are not suppurated, or become scirrhous, or cancerous, and have not carious bones for their cause. 5. Recent defluxions upon the glands of the eye-lids. 6. All defœdations of the skin, from an erysipelas, to a lepra. 7. Diseases of the glands of the nose, with their usual companion a thickness of the lip. 8. Obstructions of the kidneys, where there is no inflammation, and the stone not large. 9. In recent obstructions of the liver this method will be proper, where it prevents constipations of the belly, and assists other medicines directed in icteric cases. The same remedy is said to be of signal service in the bronchocele; and is likewise recommended for the prevention of those bilious colics that so frequently affect our mariners.

To make sea-water fresh is a thing long and much wanted, for the advantage of navigation and commerce; a method for doing which has been long ago invented by Mr. Hauton, and the secret published in the Philos. Transact. It is performed by precipitating the water with oil of tartar, and then distilling it. But Mr. Appleby's process, which was referred by the lords of the admiralty to the college of physicians, and communicated to the royal society, with some experiments therewith, on Feb. 8, 1753, appears to be more successful, and is performed thus: into twenty gallons of sea-water put six ounces of a fixed alkali, prepared with quick-lime as strong as lapis infernalis, and six ounces of bones, calcined to a whiteness, and finely powdered; with a slow fire, draw off, in a common still, fifteen gallons. Mr. Appleby conceives that the alkali here employed is the best adapted to prevent the bituminous matter in sea-water from rising by heat in distillation.

In the year 1755, a method of procuring any quantity of fresh water at sea was published by Dr. Butler; together with a method also of preserving fresh water entirely pure, sweet, and wholesome, during the longest voyage, and in the warmest climates. The method more expressly recommended by the doctor for making sea-water fresh, is to put a measured wine-quart of the strongest soap leys to fifteen gallons of sea-water, which being distilled, he assures us, will generally yield twelve gallons of fresh water. The above quantity of soap leys, we are told, will bear a repetition of the same quantity of water four or five times.

This method of Dr. Butler was tried, by order of the lords of the admiralty, at the same time with Mr. Appleby's: but the latter, being found to be performed with a less quantity of fuel, was preferred.

In order to keep fresh water sweet, Dr. Butler directs to take of fine, clear, white pearl ashes, a quarter of a pound aver-

dupois.

dupois, and put into one hundred gallons of fresh water; observing this proportion to a greater or less quantity, and stop up your cask as usual, till you have occasion to broach it.

For the ebbing and flowing of the sea, see the article TIDES.

For the sea-army, sea-astrolabe, sea-bisket, sea-chart, sea-compass, &c. see the articles ARMY, ASTROLABE, BISKET, CHART, &c.

SEA-MEN, such as are reserved to serve the king, or other persons, at sea, who may not depart without license, &c. Seamen fighting, quarreling, or making any disturbance, may be punished by the commissioners of the navy, with fine and imprisonment. Registered sea-men are exempted from serving in any parish-office, &c. and are allowed bounty money besides their pay. By the law of merchants, the sea-men of a vessel are accountable to the master or commander, and the master to the owners, and the owners to the merchants, for damage sustained either by negligence or otherwise. Where a seaman is hired for a voyage, and he deserts it before it is ended, he shall lose his wages; and in case a ship be lost by a tempest, or in a storm, the sea-men lose their wages, as well as the owners their freight. See NAVAL AFFAIRS.

SEAFORD, a port-town of Sussex, situated on the english channel, seven miles south of Lewes.

It sends two members to parliament.

SEAL, *sigillum*, a puncheon, or piece of metal, or other matter, usually either round or oval, whereon are engraven the arms, device, &c. of some prince, state, community, magistrate or private person, often with a legend or subscription, the impression whereof in wax, serves to make acts, instruments, &c. authentic.

Before the time of William the conqueror, the makers of all deeds only subscribed their names, adding the sign of the cross, and a great number of witnesses; but that monarch and the nobility used seals with their arms on them, which example was afterwards followed by others. The colour of the wax wherewith this king's grants were sealed was usually green, to signify that the act continued fresh for ever, and of force. A seal is absolutely necessary in respect of deeds, because the sealing of them makes persons parties thereto, and without being sealed, they are void in law. It is held, that if a seal be broken off, it will render the deed void, and that where several are bound in a bond, the pulling off the seal of one vacates it as to all the rest.

The king's great seal is that whereby all patents, commissions, warrants, &c. coming from the king are sealed. The keeping hereof is in the hands of the lord high chancellor, who is hence denominated lord keeper. Indeed there is some difference between the lord chancellor and lord keeper, not in office, but in the manner of creation, the latter being made by the delivery of the great seal to him by the king, but the former having a patent. The king's privy seal is a seal that is usually first set to grants that are to pass the great seal. See KEEPER.

SEAL is also used for the wax or lead, and the impression thereon, affixed to the thing sealed.

SEALER, an officer in chancery appointed by the lord chancellor or keeper of the great seal, to seal the writs and instruments there made in his presence.

SEALING, in architecture, the fixing a piece of wood or iron in a wall with plaster, mortar, cement, lead, and other solid binding. For staples, hinges and joints, plaster is very proper.

SEALING-WAX. See the article WAX.

SEAM or SEME *of corn*, is a measure of eight bushels.

SEAM *of glass*, the quantity of 120 pound, or 24 stones, each five pounds weight. The seam of wood is an horse load.

SEAMS *of a ship*, are places where her planks meet and join together. There is also a kind of peculiar seam in the sowing of sails, which they call monk-seam; the other seam of a sail is the round seam, so called from its being round like the common seams.

SEARCE. See the article SIEVE.

SEARCHER. See the article ALNAGER. Searcher is also an officer of the customs, whose business is to search and examine all ships outward bound, to see whether they have any prohibited or unaccustomed goods on board.

SEAR-CLOTH, or CERE-CLOTH, in surgery, a form of external remedy somewhat harder than an unguent, yet softer than an emplaster, though it is frequently used both for the one and the other. The sear-cloth is always supposed to have wax in its composition, which distinguishes and even denominates it. In effect, when

when a liniment or unguent has wax enough in it, it does not differ from a fear-cloth. Sear-cloths are a kind of fubftitutes to friction, and are fometimes ufed for other purpofes; the beft are compounded of refolvent drugs, as faffron, myrrh, and aloes, incorporated with wax and gums, as galbanum, gum ammoniac, and fagapenum, the whole tempered with wine.

SEASE. See the article SEIZE.

SEASIN, or SEASING, in a fhip, the name of a rope by which the boat rides by the fhip's fide when in harbour, &c.

SEASONS, in cofmography, certain portions or quarters of the year, diftinguifhed by the figns which the earth then enters, or by the meridian altitudes of the fun, confequent on which are different temperatures of the air, different works in tillage, &c. The year is divided into four feafons, fpring, fummer, autumn, and winter. The beginnings and endings of each whereof, fee under its proper article, SPRING, &c.

How the courfe of the earth's revolution about the fun conftitutes all the variety of the feafons, may be feen under the article EARTH.

SEASONING *of timber*. See TIMBER.

SEAT, in aftronomy. See SCHEAT.

SEAT, in the manege, the pofture or fituation of the horfeman upon the faddle.

SEBASTIAN ST. a port-town of Spain, in the province of Bifcay, and territory of Guipufcoa, fituated in weft long. 1° 50′, north lat. 43° 35′.

SEBESTEN, or CORDIA, in botany. See the article CORDIA.

SEBUM, SUET, in anatomy. See SUET.

SECALE, or SECALINA, RYE, in botany, a genus of the triandria-digynia clafs of plants, the corolla whereof confifts of two valves; the exterior valve is rigid, ventricofe, acuminated and compreffed, its lower edge is ciliated, and it terminates in a long arifta: the interior valve is lanceolated and plane; the nectaria are two, ovated and erect; the corolla ferves the office of a pericarpium, inclofing the feed, and, at a proper time, opening and dropping it out; the feed is fingle, oblong, and almoft cylindric. See RYE.

SECANT, in geometry, is a line that cuts another, or divides it into two parts. See the article LINE.

Thus the line AM (plate CCXLIII. fig. 7. n° 1.) is a fecant to the circle AED, &c. as it cuts it in B.

It is demonftrated by geometers, 1. That if feveral fecants MA, MN, ME, &c. be drawn from the fame point M, that paffing through the center MA is the greateft, and the reft are all fo much the lefs as they are more remote from the center. On the contrary, the portions thereof without the circle MD, MO, MB, are fo much the greater as they are farther from the center. 2. That if two fecants, MA and ME be drawn from the fame point M, the fecant MA will be to ME, as MD to MB. See the article TANGENT.

In trigonometry, the fecant denotes a right line drawn from the center of a circle, which cutting the circumference, proceeds till it meets with a tangent to the fame circle: thus the line FC (*ibid.* n° 2) drawn from the center C till it meet the tangent EF, is called a fecant; and particularly the fecant of the arch AE to which EF is a tangent. The fecant of the arch AH, which is the complement of the former arch to a quadrant, is called the co-fecant, or fecant of the complement. See the articles CIRCLE, COMPLEMENT, &c.

For the properties and ufe of the fecant, fee the articles TRIGONOMETRY, NAVIGATION, SURVEYING, &c.

For the line of fecants on the fector, fee the article SECTOR.

SECOMIÆ, in natural hiftory, the name of a genus of foffils, of the clafs of the feptariæ, the characters of which are; that they are bodies of a dufky hue, divided by fepta, or partitions of a fparry matter, into feveral more or lefs regular portions, of a moderately firm texture, not giving fire with fteel, but fermenting with acid menftrua, and eafily calcining. See SEPTARIÆ.

The feptariæ of this genus are, of all others, the moft common, and are what have been known by the little expreffive, or miftaken names of the waxen vein, or ludus helmontii. We have many fpecies of thefe bodies common among us. Of the whitifh or brownifh kinds we have thirteen; of the yellowifh five, and of the ferrugineous ones four.

SECOND, in geometry, chronology, &c. the fixtieth part of a prime or minute, whether of a degree, or of an hour: it is denoted by two fmall accents, thus (″). See DEGREE, HOUR, MINUTE, &c.

SECOND, in mufic, one of the mufical intervals; being only the difference be-

tween any found, and the next nearest found, whether above or below it. See the article INTERVAL.

As in the compass of a tone some reckon nine sensible sounds, and others ten, which form the intervals called commas; so there are eight kinds of seconds according to the former opinion, and nine according to the latter. However, in practice, they usually distinguish only four sorts. 1. That called a diminished second, containing four commas; being the difference, for instance, of a natural *ut*, and an *ut* sharp. 2. That called a second minor, or imperfect second, containing five commas, *viz.* from *mi* to *fa*; or from *la* to B *mol*; or from *fa* sharp to *sol*. 3. A major second, called by the Italians a perfect second, containing nine commas. 4. A redundant second, composed of a whole tone, and a minor semitone.

SECOND *deliverance*, *secunda deliberatione*, a judicial writ that lies after nonsuit of the plaintiff in replevin, and a returno habendo of the cattle replevied, adjudged to him that distrained them; commanding the sheriff to replevy the same cattle again, upon security given by the plaintiff in the replevin for a redelivery of them, if the distress be justified. It is a second writ of replevin, *&c.*

SECONDARY, in general, something that acts as second, or in subordination to another.

Secondary circles of the sphere are circles passing through the poles of some great circle: thus the meridians and hour-circles are secondaries to the equinoctial. There are also secondaries passing through the poles of the ecliptic, by means of which all stars are referred to the ecliptic. See the articles ECLIPTIC, LONGITUDE, SPHERE, *&c.*

SECRETARY, an officer who by his master's orders writes letters, dispatches, and other instruments, which he renders authentic by his signet. Of these there are several kinds; as, 1. Secretaries of state, who are officers that have under their management and direction the most important affairs of the kingdom, and are obliged constantly to attend on the king: they receive and dispatch whatever comes to their hands, either from the crown, the church, the army, private grants, pardons, dispensations, *&c.* as likewise petitions to the sovereign; which when read, are returned to them; all which they dispatch according to the king's direction. They have authority to commit persons for treason, and other offences against the state, as conservators of the peace at common law, or as justices of the peace throughout the kingdom. They are members of the privy-council, which is seldom or never held without one of them being present; and as to the business and correspondence in all parts of this kingdom, it is managed by either of the secretaries without any distinction; but with respect to foreign affairs, the business is divided into two provinces, or departments, the southern and the northern, comprehending all the kingdoms and states that have any intercourse with Great Britain; each secretary receiving all letters and addresses from, and making all dispatches to, the several princes and states comprehended in his province. Ireland and the plantations are under the direction of the elder secretary, who has the southern province, which also comprehends France, Italy, Switzerland, Spain, Portugal, and Turky: the northern province includes the Low Countries, Germany, Denmark, Sweden, Poland, and Muscovy. Each of the secretaries have an apartment in all the royal houses, both for their own accommodation and their officers; they have also a table at the king's charge, or else board-wages. The two secretaries of state have each two under secretaries, and one chief clerk, with an uncertain number of other clerks and translators, all wholly depending on them. To the secretaries of state belong the custody of that seal properly called the signet, and the direction of two other offices, one called the paper-office, and the other the signet-office.

2. Secretary of an embassy, a person attending an embassador for writing dispatches relating to the negociation. There is a great difference between the secretary of an embassy, and the embassador's secretary; the last being a domestic or menial of the embassador, and the first, a servant or minister of the prince.

3. The secretary of war, an officer of the war-office, who has two chief clerks under him, the last of which is the secretary's messenger. There are also secretaries in most of the other offices.

SECRETION, *secretio*, in the animal oeconomy, the separation of some fluid mixed with the blood by means of the glands. See the article GLAND.

In the bodies of animals we observe a great

great number of juices of different natures, *viz.* the blood, lympha, saliva, stomach-liquor, intestinal juices, pancreatic juice, bile, urine, *&c.* and the blood is the general source of all. See the articles BLOOD, LYMPH, SALIVA, *&c.*

The manner wherein this secretion is performed, has been greatly enquired into for a century past; but as the exceeding minuteness of the organs whereby secretion is effected prevents any regular search, various authors have imagined various methods for explaining it. The antient physicians contented themselves only with asserting certain particular virtues or faculties inherent in the viscera, whereby they were determined to separate one liquor rather than another. Some of the moderns, full of the effects they have observed from fermentations, maintain, that there are ferments in the several parts, by the aid whereof certain kinds of particles mixed in the blood are separated therefrom, after the same manner as we see in must or new wine, from which, while fermenting, certain parts are detached in form of froth. Others consider the glands as kinds of sieves, whose holes having different figures, will only let pass certain particles or molecules, whose figures resemble those of the holes; but the many inconveniencies which both these suppositions have to grapple withal, made some naturalists have recourse to what is called imbibition: these maintain, that besides the different diameters of the pores, it is required that the several parts be already imbued or moistened with a liquor like to that they are to filtre.

This opinion Winslow adopted; and not satisfied with conjectural principles, applied himself to experiments, in order to investigate the manner wherein secretion is performed, and lays it down thus. It is well known that a piece of brown paper, which is only an assemblage of small fibres compacted close to each other, having once imbibed oil or water, will never let any other liquor pass through it but of the same kind with what it is impregnated with; all others it stops. Now in the secretory ducts of the glands we find a parallel structure, an assemblage of fine threads or filaments bound close together, much as in brown paper, *&c.* only differently disposed; this plexus then having once imbibed a certain juice, will not let pass any of the liquors which arrive at the orifices of these ducts, but that which it had first imbibed: the cause of this phænomenon is referred to the attraction of cohesion, which is found stronger between the homogeneous than the heterogeneous parts of the same fluid. As the blood then is not a homogeneous liquor, but a compound of an infinity of different parts or molecules, some oily, others mucilaginous, aqueous, saline, subtile, gross, *&c.* in its motion along the arteries of the gland, it becomes divided into all the little ramifications thereof, by which means its velocity is exceedingly abated, and the molecules are obliged to go off, one by one, through the narrow passage of the artery into the vein, and of consequence to pass over the orifice of the secretory ducts of the glands, whose down is already tinged with a juice of a certain nature: such of the molecules, therefore, as are found of the same nature with the juice they meet withal at the entrance of the secretory duct, join themselves to them, and entering the ducts, are driven on by others that follow them, and are at length driven into the excretory duct. But how these parts should have first imbibed the particular juices necessary for their respective secretions, is the question. Mr. Winslow thinks it probable that they had been imbued with the juices they were to filtrate at the first formation of the animal, or at the time when the solid parts were framed.

Kiel accounts for secretion from the joint consideration of the different diameters of the vessels, the different velocity of the blood, the different angles the ducts make with the arteries, and the different attraction of the various parts under all these different circumstances. It is observed, that in this theory there is something arbitrary and conjectural; besides, that the reasoning is carried on to such a length, that in a thing, the principles whereof are so obscure, the parts or organs so imperfectly known, and the whole process carried on out of sight, the mind cannot safely acquiesce in it.

Hales makes it evident from experiments, that the animal secretions are not made with the full force of the arterial blood, but more gradually and sparingly, so as to be carried forward in those very fine vessels by an alternate pulsive force of the arterial fluid, and attractive power of the fine secerning vessels, assisted also by constant vibrations; for the animal

fluids and solids are in an inceffant, mutually, vibrating ftate. In this manner, doubtlefs, the plentiful fecretions are made into the ftomach and guts, as alfo in the pancreas, mefenteric, falival, and other glands of the body; and thus alfo the perfpiring matter is carried off, not by the more protrufive force of the arterial blood alone, but alfo by the warmth and mutual action of the fluids and folids. See PERSPIRATION, &c.

For the ufe, &c. of the animal fecretions, fee EXCRETION and EXCREMENT.

SECT, *fecta*, a collective term, comprehending all fuch as follow the doctrines and opinions of fome famous divine, philofopher, &c. See the articles HERESY and SCHISM.

The principal fects among the antient philofophers were the epicureans, peripatetics, academics, ftoics, pyrrhonifts, &c. See the article EPICUREANS, &c. Among the moderns, the newtonians, cartefians, &c. are the principal ones in Europe. See NEWTONIAN, &c.

And the calvinifts, lutherans, papifts, anabaptifts, arians, focinians, arminians, &c. are the principal fects to be found among modern divines. See the article CALVINISTS, &c.

SECTA *ad curiam*, in law, a writ which lieth againft him who refufeth to perform his fuit to the county-court, or court-baron.

SECTA *curiæ*, in our old writers, fuits and fervice done by the tenants at the court of their lord.

SECTA *facienda per illam quæ habet æniciam partem*, a writ to compel the heir that hath the elder's part among coheirs, to perform fervice for all the coparceners.

SECTA *molendini*, a writ lying where a man by ufage, time out of mind, &c. has ground his corn at the mill of a certain perfon, and afterwards goes to another mill with his corn, thereby withdrawing his fuit to the former. And this writ lies efpecially for the lord againft his tenants, who hold of him to do fuit at his mill.

SECTA *regalis*, a fuit by which all perfons were bound twice in a year to attend the fheriff's tourn, and was called regalis, becaufe the fheriff's tourn was the king's leet; wherein the people were to be obliged by oath to bear true allegiance to the king, &c.

SECTA *unica tantum facienda pro pluribus hæreditatibus*, a writ that lies for an heir who is diftrained by the lord to do more fuits than one, in refpect of the land of divers heirs defcended to him.

SECTINEUS, in anatomy, a fmall, flat, and pretty long mufcle, broad at the upper part, and narrow at the lower; fituated obliquely between the os pubis, and the upper part of the os femoris. It is commonly a fingle mufcle, but is fometimes found double. It is fixed above by flefhy fibres to all the fharp ridge, or crifta of the os pubis, and to a fmall part of the oblong notch, or depreffion on the fore fide of the crifta, in which the upper extremity of this mufcle is lodged; from thence it runs down obliquely towards the little trochanter, under, and a little behind which, it is inferted obliquely by a flat tendon between the fuperior infertion of the vaftus internus, and inferior infertion of the triceps fecundus, with which it is united.

SECTION, in general, denotes a part of a divided thing, or the divifion itfelf. Such, particularly, are the fubdivifions of a chapter; called alfo paragraphs and articles: the mark of a fection is §.

SECTION, in geometry, denotes a fide or furface appearing of a body or figure cut by another; or the place where lines, planes, &c. cut each other.

The common fection of two planes is always a right line; being the line fuppofed to be drawn on one plane by the fection of the other, or by its entrance into it.

SECTION *of a building*, in architecture, is the fame with its profile; or a delineation of its heights and depths raifed on a plane, as if the fabric was cut afunder to difcover its infide.

*Cæfarean* SECTION. See the article CÆSAREAN SECTION.

*Conic* SECTIONS, in geometry. See the articles CONE and CONIC.

SECTOR, in geometry, is a part of a circle, comprehended between two radii and the arch; or it is a mixed triangle, formed by two radii and the arch of a circle. See the articles CIRCLE, ARCH, RADIUS, TRIANGLE, &c.

For the method of finding the area of a fector, as well as of a fegment of a circle, fee the article SEGMENT.

SECTOR is alfo a mathematical inftrument, of great ufe in finding the proportion between quantities of the fame kind, as between lines and lines, furfaces and furfaces, &c. for which reafon the French call it the compafs of proportion.

The great advantage of the fector above com-

common ſcales, &c. is, that it is adapted to all radii, and all ſcales. For, by the line of chords, ſines, tangents, &c. on the ſector, we have lines of chords, ſines, tangents, &c. adapted to any radius betwixt the length and breadth of the ſector, when opened.

The ſector is founded on the fourth propoſition of the ſixth book of Euclid, where it is demonſtrated, that ſimilar triangles have their homologous ſides proportional; an idea of its foundation or theory may be conceived from what follows: let the lines A B, A C (plate CCXLIII. fig. 4.) repreſent the two legs of the ſector, and A D, A E, two equal ſections from the center. If now the points B C and D E be connected, the lines B C and D E will be parallel; therefore the triangles A D E, and A B C, will be ſimilar, and conſequently the ſides A D, D E, A B, B C, proportional; that is, as A D : D E : : A B : B C; whence, if A D be the half, third, or fourth part of A B, D E will be a half, third, or fourth part of B C. Whence it follows, that if A D be the chord, ſine, tangent, &c. of any number of degrees to the radius A B, D E will be the ſame to the radius B C.

*Deſcription of the* SECTOR. This inſtrument conſiſts of two equal legs, or rules of braſs, &c. riveted together, but ſo as to move eaſily on the rivet; (*ibid.* fig. 1, 2.) on the faces of the inſtrument are placed ſeveral lines; the principal of which are the line of equal parts, line of chords, line of ſines, line of tangents, line of ſecants, and line of polygons.

The line of equal parts, called alſo the line of lines, marked L, is a line divided into 100 equal parts, and, where the length of the leg will allow it, each of theſe is ſubdivided into halves and quarters. It is found on each leg, on the ſame ſide, and the diviſions numbered 1, 2, 3, 4, 5, &c. to 10, which is near the extremity of each leg. Note, in practice, 1 repreſents either 1, 10, 100, 1000, 10000, &c. as occaſion requires, in which caſe, 2, repreſents 2, 20, 200, 2000, 20000, &c. and ſo of the reſt. The line of chords, marked C on each leg, is divided after the uſual manner, and numbered 10, 20, 30, &c. to 60. The line of ſines, denoted on each leg by the letter S, is a line of natural ſines, numbered 10, 20, 30, &c. to 90. The line of tangents, denoted on each leg by the letter T, is a line of natural tangents, numbered 10, 20, 30, &c. to 45. Beſides which there is another little line of tangents on each leg, commencing at 45°, and extending to 75°, denoted by the letter *t*. Line of ſecants, denoted on each leg by the letter *ſ*, is a line of natural ſecants, numbered 10, 20, 30, &c. to 75, not commencing at the center of the inſtrument, but at ſome diſtance therefrom. The line of polygons, denoted by the letter P on each leg, is numbered 4, 5, 6, &c. to 12, which falls conſiderably ſhort of the center of the inſtrument. See CHORD, SINE, &c.

Beſides theſe lines, which are eſſential to the ſector, there are others placed near the outward edges on both ſides, and parallel thereto, which are in all reſpects the ſame as thoſe on Gunter's ſcale, and uſed after the ſame manner. Such are the lines of artificial ſines marked S, of artificial tangents marked T, and Gunter's line of numbers marked N; theſe lines do not extend to the end of the inſtrument. There are ſometimes other lines placed, to fill the vacant ſpaces, as the lines of hours, latitudes, and inclination of meridians, which are uſed the ſame as on the common ſcales. See the articles GUNTER, SCALE, &c.

The lines found by the ſector are of two kinds, lateral and parallel; the firſt are ſuch as are found by the ſides of the ſector, as A B, A C (*ibid.* fig. 4.) the latter ſuch as go acroſs from one leg to the other, as D E, B C. Note, the lines are not placed in the ſame order on all ſectors, but they may be eaſily found by the above directions.

*Uſe of the line of equal parts on the* SECTOR.

1. To divide a given line into any number of equal parts, ſuppoſe ſeven. Take the given line in your compaſſes, and ſetting one foot in a diviſion of equal parts, that may be divided by ſeven, for example 70, whoſe ſeventh part is 10, open the ſector till the other point fall exactly on 70, in the ſame line on the other leg. In this diſpoſition, applying one point of the compaſſes to 10, in the ſame line, ſhut them till the other fall in 10, in the ſame line, on the other leg, and this opening will be the ſeventh part of the given line. Note, if the line to be divided be too long to be applied to the legs of the ſector, divide only one half, or one fourth by 7, and the double or quadruple thereof will be the ſeventh part of the whole.

2. To meaſure the lines of the perimeter of

of a polygon, one of which contains a given number of equal parts. Take the given line in your compasses, and set it parallel, upon the line of equal parts, to the number on each leg expressing its length. The sector remaining thus, set off the length of each of the other lines parallel to the former, and the numbers each of them falls on, will express their lengths.

3. A right-line being given, and the number of parts it contains, suppose 120, to take from it a shorter line, containing any number of the same parts, suppose 25. Take the given line in your compasses, open the sector till the two feet fall on 120 on each leg; then will the distance between 25 on one leg, and the same number on the other, give the line required.

4. To multiply by the line of equal parts on the sector. Take the lateral distance from the center of the line to the given multiplicator; open the sector till you fit that lateral distance to the parallel of 1 and 1, or 10 and 10, and keep the sector in that disposition; then take in the compasses the parallel distance of the multiplicand, which distance, measured laterally on the same line, will give the product required. Thus, suppose it were required to find the product of 8, multiplied by 4: take the lateral distance from the center of the line to 4 in your compasses, *i. e.* place one foot of the compasses in the beginning of the divisions, and extend the other along the line to 4. Open the sector till you fit this lateral distance to the parallel of 1 and 1, or 10 and 10. Then take the parallel distance of 8, the multiplicand; *i. e.* extend the compasses from 8, in this line, on one leg, to 8 in the same line on the other, and that extent, measured laterally, will give the product required.

5. To divide by the line of equal parts on the sector. Extend the compasses laterally from the beginning of the line to 1, and open the sector till you fit that extent to the parallel of the divisor; then take the parallel distance of the dividend, which extent, measured in a lateral direction, will give the quotient required. Thus suppose it was required to divide 36 by 4; extend the compasses, laterally, the beginning of the line to 1, and fit to that extent the parallel of 4, the divisor; then extend the compasses parallel, from 36 on one leg, to 36 on the other, and that extent, measured laterally, will give 9, the quotient required.

6. To work any proportion by the sector. Take the second term lateral, and, opening the sector, apply that extent parallel in the first term, and stay the sector in that position; then take the parallel distance of the third term, which extent, measured laterally, gives the fourth term required. This is so easy, from what has already been said, that it needs no example.

*The use of the line of chords on the* SECTOR.

1. To open the sector so as the two lines of chords may make an angle or number of degrees, suppose 40. Take the distance from the joint to 40, the number of the degrees proposed, on the line of chords; open the sector till the distance from 60 to 60, on each leg, be equal to the given distance of 40; then will the two lines on the sector form an angle of 40 degrees, as was required.

2. The sector being opened, to find the degrees of its aperture. Take the extent from 60 to 60, and lay it off on the line of chords from the center; the number whereon it terminates will shew the degrees, *&c.* required.

3. To lay off any number of degrees upon the circumference of a circle. Open the sector till the distance between 60 and 60 be equal to the radius of the given circle; then take the parallel extent of the chord of the number of degrees on each leg of the sector, and lay it off on the circumference of the given circle. Hence any regular polygon may be easily inscribed in a given circle.

*Use of the line of polygons on the* SECTOR.

1. To inscribe a regular polygon in a given circle. Take the semi-diameter of the given circle in the compasses, and adjust it to the number 6, on the line of polygons, on each leg of the sector: then, the sector remaining thus opened, take the distance of the two equal numbers, expressing the number of sides the polygon is to have; *e. gr.* the distance from 5 to 5 for a pentagon, from 7 to 7 for a heptagon, *&c.* These distances carried about the circumference of the circle, will divide it into so many equal parts.

2. To describe a regular polygon, *e. gr.* a pentagon, on a given right line. Take the length of the line in the compasses, and apply it to the extent of the number 5, 5, on the lines of polygons. The sector thus opened, upon the same lines,

take the extent, from 6 to 6; this will be the semi-diameter of the circle the polygon is to be inscribed in. If, then, with this distance, from the ends of the given line, you describe two arches of a circle, their intersection will be the center of the circle.

3. On a right line, to describe an isosceles triangle, having the angles at the base double that at the vertex. Open the sector, till the ends of the given line fall on 10 and 10 on each leg; then take the distance from 6 to 6. This will be the length of the two equal sides of the triangle.

*Use of the lines of sines, tangents, and secants, on the* SECTOR. By the several lines disposed on the sector, we have scales to several radiuses; so that having a length or radius given, not exceeding the length of the sector when opened, we find the chord, sine, &c. thereto, *e. gr.* Suppose the chord, sine, or tangent of 10 degrees, to a radius of 3 inches, required; make 3 inches the aperture, between 60 and 60, on the lines of chords of the two legs; then will the same extent reach from 45 to 45 on the line of tangents, and from 90 to 90 on the line of the sines on the other side; so that to whatever radius the line of chords is set, to the same are all the others set. In this disposition, therefore, if the aperture between 10 and 10, on the lines of chords, be taken with the compasses, it will give the chord of 10 degrees. If the aperture of 10 and 10 be in like manner taken on the lines of sines, it will be the sine of 10 degrees. Lastly, if the aperture of 10 and 10 be in like manner taken on the lines of tangents, it gives the tangent of 10 degrees.

If the chord, or tangent, of 70 degrees were required; for the chord, the aperture of half the arch, *viz.* 35, must be taken, as before; which distance, repeated twice, gives the chord of 70 degrees. To find the tangent of 70 degrees to the same radius, the small line of tangents must be used, the other only reaching to 45: making, therefore, 3 inches the aperture between 45 and 45 on the small line; the extent between 70 and 70 degrees on the same, will be the tangent of 70 degrees to 3 inches radius.

To find the secant of an arch, make the given radius the aperture between 0 and 0 on the line of secants: then will the aperture of 10 and 10, or 70 and 70, on the said lines, give the tangent of 10°, or 70°.

If the converse of any of these things were required; that is, if the radius be required, to which a given line is the sine, tangent, or secant, it is but making the given line, if a chord, the aperture on the line of chords, between 10 and 10, and then the sector will stand at the radius required; that is, the aperture between 60 and 60, on the said line, is the radius. If the given line were a sine, tangent, or secant, it is but making it the aperture of the given number of degrees; then will the distance of 90 and 90 on the sines, of 45 and 45 on the tangents, of 0 and 0 on the secants, be the radius.

*Use of the* SECTOR *in trigonometry.* 1. The base and perpendicular of a rectangled triangle being given, to find the hypotenuse. Suppose the base AC (*ibid.* fig. 6.) 40 miles, and the perpendicular AB 30; open the sector till the two lines of lines make a right angle: then for the base take 40 parts on the line of lines, on one leg; and for the perpendicular 30 on the same line, on the other leg: then the extent from 40 on the one, to 30 on the other, taken in the compasses, will be the length of the hypotenuse, which line will be found 50 miles.

2. The perpendicular AB of a right-angled triangle ABC being given, 30, and the angle BCA, 37°, to find the hypotenuse BC. Take the given side AB, and set it over, on each side, upon the sine of the given angle ACB; then the parallel distance of radius, or of 90 and 90, will be the hypotenuse BC; which will measure 50 on the line of sines.

3. The hypotenuse and base being given, to find the perpendicular. Open the sector, till the two lines of lines be at right angles; then lay off the given base on one of those lines from the center. Take the hypotenuse in your compasses, and, setting one foot in the point of the given base, let the other fall on the line of lines, on the other leg: the distance from the center to the point where the compasses fall, will be the length of the perpendicular.

4. The hypotenuse being given, and the angle ACB, to find the perpendicular. Make the given hypotenuse a parallel radius, *i. e.* make it the extent from 90 to

to 90 on the lines of fines; then will the parallel fine of the angle ACB be the length of the fide AB.

5. The bafe and perpendicular AB given, to find the angle BCA. Lay off the bafe AC on both fides of the fector, from the center, and note its extent: then take the given perpendicular, and to it open the fector, in the terms of the bafe; the parallel radius will be the tangent of BCA.

6. In any right-lined triangle, two fides being given, with the included angle, to find the third fide. Suppofe the fide AC (*ibid.* fig. 3.) 20, the fide BC 30, and the included angle ACB 110°; open the fector, till the two lines of lines make an angle equal to the given angle, *viz.* 110. Lay off the given fides of the triangle from the center of the fector, on each of the lines of lines; the extent between their extremes is the length of the fide AB fought.

7. The angles CAB and ACB given, and the fide CB, to find the bafe AB. Take the given fide CB, and turn it into the parallel fine of its oppofite angle CAB; and the parallel fine of the angle ACB will be the length of the bafe AB.

8. The three angles of a triangle being given, to find the proportion of the fides. Take the lateral fines of the feveral angles, and meafure them in the line of lines; the numbers anfwering thereto give the proportion of the fides.

9. The three fides being given, to find the angle ACB. Lay the fides AC, BC, along the line of lines, from the center; and fet over the fide AB in their terms: fo is the fector opened, in thefe lines to the quantity of the angle ACB.

10. The hypotenufe AC (*ibid.* fig. 5.) of a right angled fpherical triangle ABC given, *e. gr.* 43°, and the angle CAB 20°; to find the fide CB. The rule is: as radius is to the fine of the given hypotenufe 43°, fo is the fine of the given angle 20° to the fine of the perpendicular CB. Take therefore 20° from the center, along the line of fines, in your compaffes, and fet the extent from 90 to 90, on the two legs; and the parallel fine of 43°, the given hypotenufe, will, when meafured from the center of the line of fines, give 13° 30′, the fide required.

11. The perpendicular BC, and the hypotenufe AC being given, to find the bafe AB. As the fine complement of the perpendicular BC is to radius, fo is the fine complement of the hypotenufe to the fine complement of the bafe. Make, therefore, the radius a parallel fine of the given perpendicular, then the parallel fine of the hypotenufe meafured along the line of fines, will give the complement of the bafe required.

SECULAR, fomething that is temporal, in which fenfe the word ftands oppofed to ecclefiaftical: thus we fay, fecular power, fecular jurifdiction, &c.

Secular is more peculiarly ufed for a perfon who lives at liberty in the world, not fhut up in a monaftery, nor bound by vows, or fubjected to the particular rules of any religious community; in which fenfe it ftands oppofed to regular. The romifh clergy is divided into fecular and regular.

SECULAR GAMES, *ludi feculares*, in antiquity, folemn games held among the Romans once in an age. Thefe games lafted three days and as many nights, during which time facrifices were performed, theatrical fhews exhibited, with combats, fports, &c. in the circus. The occafion of thefe games, according to Valerius Maximus, was to ftop the progrefs of a plague. The firft who had them celebrated at Rome was Valerius Publicola, the firft conful created after the expulfion of the kings. The ceremonies to be obferved therein were found prefcribed in one of the books of the Sibyls. At the time of the celebration of the fecular games, heralds were fent throughout all the empire, to intimate that every one might come and fee thofe folemnities which he never yet had feen, nor was ever to fee again. Authors are not agreed as to the number of years wherein thefe games returned, partly becaufe the quantity of an age or feculum, among the antients, is not known, and partly on other accounts; fome will have it that they were held every hundred years, and that the feculum or age was our century.

SECULAR POEM, *carmen feculare*, a poem fung or rehearfed at the fecular games, of which kind we have a very fine piece among the works of Horace, being a fapphic ode at the end of his epodes.

SECULARIZATION, the act of converting a regular perfon, place, or benefice, into a fecular one. Almoft all the cathedral churches were antiently regular, that is, the canons were to be religious;

gious; but they have been since secularized. For the secularization of a regular church, there is required the authority of the pope, that of the prince, the bishop of the place, the patron, and even the consent of the people. Religious that want to be released from their vow, obtain briefs of secularization from the pope.

SECUNDA AQUA, among chemists, *&c.* aqua fortis that has been already used to dissolve some metal.

SECUNDA SUPER ONERATIONE PASTURÆ, in law, a writ that lies where admeasurement of pasture has been made, and he that first surcharged the common, does again surcharge it, notwithstanding the admeasurement.

SECUNDARY, or SECONDARY. See the article SECONDARY.

SECUNDINES, *secundinæ, after birth,* in anatomy, the several coats or membranes wherein the fœtus is wrapped up in the mother's womb, as the chorion and amnios, with the placenta, *&c.* See the articles CHORION, AMNIOS, PLACENTA, ALLANTOIS, *&c.*

Hippocrates observes, that twins have always the same secundines. The secundines must never be left in the matrix, it being a foreign body which would destroy the mother. It is dangerous even to have the least piece of it left behind. See the article DELIVERY.

The human secundines are said to be of some use in medicine. Thus they are by some ordered to be applied warm as they come from the uterus to the face, in order to remove freckles. A water is also distilled from them in balnæo mariæ for destroying spots or blemishes of the face: when dried and reduced to a powder, they are used internally against epilepsies, for accelerating the delivery of the fœtus, and allaying the pain of wounds. The dose of this powder is from half a scruple to two scruples.

Dr. Grew, in his anatomy of plants, applies the term secundine to the fourth and last coat or cover of seeds, by reason this performs nearly the same office in plants, that the membranes investing the fœtus do in animals.

SECURIDACA, in botany, a genus of the diadelphia-decandria class of plants, the corolla whereof is papilionaceous; the vexillum is roundish and very large; the alæ are obtuse, and the carina lunulated. The fruit is roundish, ending in a very large, oblong, obtuse, perpendicular membrane, broadest above; the seed is single, and is invested with the whole pericarpium.

This plant taken inwardly is good for the stomach, and is an ingredient in antidotes used in a pessary with honey before coition, supposed to prevent conception.

SECURITATE PACIS, in law, a writ lying for a person who is threatened with danger from another against him that threatens: it issues out of the court of chancery, and is directed to the sheriff, *&c.*

SECURITATEM *inveniendi quod se non divertat ad partes exteras sine licentia regis,* is an antient writ which lay for the king against any of his subjects, to stay them from going out of the kingdom to foreign parts.

SECUTORES, in antiquity, a kind of gladiators among the Romans, who fought against the retiarii. The secutores were armed with a sword and a buckler, to keep off the net or noose of their antagonists, and they wore a cask on their head.

This was also a name given to such gladiators as took the place of those killed in the combat, or who fought the conqueror.

SEDAN, a town of Champain, in France, situated on the river Maes, in east long. 4° 45′, north lat. 49° 46′.

SEDANTIA, SEDATIVE MEDICINES, in pharmacy, such medicines as are possessed of a power not only of composing, checking, and allaying the exorbitant and irregular motions of the solids and fluids, but also of alleviating and resolving the painful spasmodic strictures of the parts.

As the effect of these medicines are very extensive, we may justly include in their number paregorics, which not only relax and gently sooth the rigid fibres, but also obtund the acrimony of the juices; anodynes, which alleviate the violence of racking pains; antispasmodics, which mitigate and remove the spasmodic strictures of the parts; antiepileptics, which check convulsive motions; hypnotics, which procure sleep; and narcotics, which induce a considerable stupor of the senses and torpor of all the motions of the body. See the articles PAREGORICS, ANODYNE, *&c.*

SE DEFENDENDO, in law, a plea used for him that is charged with the death of another, by alledging that he was under a necessity of doing what he did in his own defence; as that the other assaulted him in such a manner, that if he had not done

done what he did, he muſt have been in hazard of his own life. But here the danger muſt appear ſo great, as to be inevitable. Any perſon in his juſt defence may kill others for the ſafety of his life; though if malice be coloured under a pretence of neceſſity, or one kill another before he is under a neceſſity of ſo doing, the ſame may be either murder or manſlaughter by our law. See the articles MURDER and MANSLAUGHTER.

Where two perſons ſuddenly fall out, and one of them, being attacked, flies to the wall, or any unpaſſable place, as far as he can, in order to ſave his life, but being ſtill purſued, kills the perſon that attacked him, this killing, as well as others in the like caſes, is ſe defendendo. In ſe defendendo, though the affair juſtifies the killing to have been in his own defence, he is nevertheleſs obliged to ſue out his pardon from the lord chancellor, which of courſe is granted him, but yet his goods and chattels become forfeited to the king. It is ſaid, however, that upon the ſpecial matter found, he may be diſmiſſed without any forfeiture, *&c.*

SEDIMENT, the ſettlement or dregs of any thing, or that groſs heavy part of a fluid body which, upon reſting, ſinks to the bottom of the veſſel.

SEDITION, among civilians, is uſed for an irregular commotion of the people, or an aſſembly of a number of citizens without lawful authority, tending to diſturb the peace and order of the ſociety. This offence is of different kinds: ſome *ſeditions* more immediately threatening the ſupreme power, and the ſubverſion of the preſent conſtitution of the ſtate; others tending only towards the redreſs of private grievances. Among the Romans, therefore, it was variouſly puniſhed, according as its end and tendency threatened greater miſchief. In the puniſhment, the authors and ringleaders were juſtly diſtinguiſhed from thoſe, who with leſs wicked intention joined, and made part of the multitude. The ſame diſtinction holds in the law of England, and in that of Scotland. Some kinds of ſedition in England amount to high-treaſon, and come within the ſtat. 25 Edw. III. as levying war againſt the king. And ſeveral ſeditions are mentioned in the Scotch acts of parliament as treaſonable. The law of Scotland makes riotous and tumultuous aſſemblies a ſpecies of ſedition. But the law there, as well as in England, is now chiefly regulated by the riot act, made 1 Geo. I. only it is to be obſerved, that the proper officers in Scotland, to make the proclamation thereby enacted, are ſheriffs, ſtewards, and bailies of regalities, or their deputies; magiſtrates of royal burroughs, and all other inferior judges and magiſtrates; high and petty conſtables, or other officers of the peace in any county, ſtewartry, city or town. And in that part of the iſland, the puniſhment of the offence is death and confiſcation of moveables: in England it is felony. See the article RIOT.

SEDR, or SEDRE, the high prieſt of the ſect of Ali among the Perſians. The ſedr is appointed by the emperor of Perſia, who uſually confers the dignity on his neareſt relation. The juriſdiction of the ſedr extends over all effects deſtined for pious purpoſes, over all moſques, hoſpitals, colleges, ſepulchres, and monaſteries. He diſpoſes of all eccleſiaſtical employments, and nominates all the ſuperiors of religious houſes. His deciſions in matters of religion are received as ſo many infallible oracles; he judges of all criminal matters in his own houſe without appeal. His authority is balanced by that of the mudſitehid, or firſt theologue of the empire.

SEDUM, in botany, a genus of the decandria pentagynia claſs of plants, the corolla whereof conſiſts of five accuminated, lanceolated, plane, patent petals; the fruit conſiſts of five erecto-patent, accuminated compreſſed capſules, emarginated towards the baſe, and opening longitudinally upwards and downwards; the ſeeds are numerous and ſmall.

This genus comprehends the ſedum, or houſe-leek, orpine, wall-pepper, and other ſpecies; all which agree in virtues with orpine. See ORPINE.

SEED, *ſemen*, in phyſiology, a ſubſtance prepared by nature, for the reproduction and conſervation of the ſpecies, both in animals and plants. See GENERATION.

The ſeed of animals, and particularly of mankind, is a whitiſh fluid ſecreted from the blood in the teſtes. See TESTES.

It is the thickeſt and moſt elaborated of all the humours in the human body; and by a chemical analyſis, is found to conſiſt almoſt entirely of oil and volatile ſalts blended with a little phlegm. The ſeminal liquor, however, ſuch as emitted for uſe, is a mixture of the true ſemen with the liquors of the proſtatæ, and other glands of the penis: all which, in the act of coition, are poured at the ſame time

time into the common canal of the urethra, either from the glands where they are fecreted, or the refervoirs where they are kept; and being there blended together, are injected into the uterus. See the articles CONCEPTION, GENERATION, FOETUS, &c.

The feed of vegetables is their laft product, whereby the fpecies are propagated; being frequently the fruit of a plant, but fometimes only a part included in the fruit.

Every feed confifts of an embryo-plant, called plantula feminalis, with its covers. The embryo, which is the whole future plant in minature, is called the germ or bud; and is rooted in the cotyledon or placenta, which makes its involucrum or cover. The cotyledon is always double; and in the middle, and common center of the two, is a point or fpeck, *viz.* the embryo plantule, which being acted on by the warmth of the fun and of the earth, begins to protrude its radicle, or root, downwards, and its bud upwards; and as the requifite heat continues, it draws nourifhment by the root, and fo continues to unfold itfelf and grow. See the article VEGETATION.

The two placentulæ, or cotyledons of a feed are, as it were, a cafe to the little embryo plant; covering it up, and fheltering it from injuries, and feeding it from their own proper fubftance; which the plantule receives, and draws to itfelf by an infinite number of little filaments, which it fends into the body of the placenta.

The cotyledons for the moft part, abound with a balfam difpofed in proper cells; aud this feems to be oil brought to its greateft perfection, while it remains tumid, and lodged in thefe repofitories: one part of the compofition of this balfam is oily and tenacious, and ferves to defend the embryo from any extraneous moifture; and, by its vifcidity, to entangle and retain the fine, pure, volatile fpirit, which is the ultimate production of the plant. This oil is never obferved to enter into the veffels of the embryo, which are too fine to admit fo thick a fluid. The fpirit, however, being quickened by an active power, may poffibly breathe a vital principle into the juices that nourifh the embryo, and ftamp upon it the character that diftinguifhes the family; after which every thing is changed into the proper nature of that particular plant.

Now, when the feed is committed to the earth, the placenta ftill adheres to the embryo for fome time, and guards it from the accefs of noxious colds, &c. and even prepares and purifies the cruder juice the young plant is to receive from the earth, by ftraining it through its own body. This it continues to do, till the embryo-plant being a little enured to its new element, and its root tolerably fixed in the ground, and fit to abforb the juice thereof, it then perifhes, and the plant may be faid to be delivered; fo that nature obferves the fame method in plants contained in fruits, as in animals in the mother's womb.

To explain this procefs of nature, let A, B, (plate CCXLIV. fig. 1.) be the two lobes, or cotyledons, of a bean flit open, and connected together by little white fprigs in O; in each lobe are feen the branches, *a, a, a,* of the feed-roots, *e, e,* which feed the little bud or fprout, *f,* with the pulp, or matter of the bean, till the earth root O C is capable of penetrating the earth, and extending its branches fufficiently to extract nourifhment from the earth, both for itfelf and the plant it is to fuftain. See the article EARTH.

Many forts of feeds will continue good for feveral years, and retain their vegetative faculty; whereas others will not grow after they are one year old; this difference is in a great meafure owing to their abounding more or lefs with oil; as alfo to the nature of the oil, and the texture of their outward covering. All feeds require fome fhare of frefh air, to keep the germen in an healthy ftate; and where the air is abfolutely excluded, the vegetative quality of the feeds will be foon loft. But feeds will be longeft of all preferved in the earth, provided they are buried fo deep as to be beyond the influence of the fun and fhowers; fince they have been found to lie thus buried twenty or thirty years, and yet vegetate as well as new feeds. How the vegetative life is fo long preferved, by burying them fo deep in the ground, is very difficult to explain; but as the fact is very well known, it accounts for the production of plants out of earth taken from the bottom of vaults, houfes, &c.

In the common method of fowing feeds, there are many kinds which require to be fown foon after they are ripe; and there are many others which lie in the

 ground

ground a year, sometimes two or three years, before the plant comes up: hence when seeds brought from distant countries are sown, the ground should not be disturbed, at least for two years, for fear of destroying the young plants.

As to the method of preserving seeds, the dry kinds are best kept in their pods or outer coverings; but the seeds of all soft fruits, as cucumbers, melons, &c. must be cleansed from the pulp and mucilage which surround them, otherwise the rotting of these parts will corrupt the seeds.

When seeds are gathered, it should always be done in dry weather; and then they should be hung up in bags in a dry room, so as not to deprive them of air.

Dispensatory-writers divide the seeds used in medicine into four classes: 1. The four greater hot seeds, *viz.* of aniseed, fennel, caraway, and cummin. 2. The four lesser hot seeds, *viz.* of bishop's-weed, stone-parsley, smallage, and wild carrot. 3. The four greater cold seeds, *viz.* cucumber, cucurbit, citruls, and melons. 4. The four lesser cold seeds, *viz.* endive, scariola, lettuce, and purslain. See ANISE, FENNEL, &c.

But besides these, there are many other seeds prescribed for their medicinal virtues; as those of coriander, dill, thlaspi, mustard, linseed, fœnugreek, carthamus, navew, ricinus, sorrel, psyllium, stavesacre, &c. See CORIANDER, &c.

*Change of* SEED. See CHANGE *of Seed.* Seed-wheat should be bought from the crop on a strong clay-land, whatever kind of land it is to be sowed upon. A white clay is a good change for a red clay, and a red clay for a white; but whatever the land be, from which the seed is taken, it may be infected, if that be not changed there the preceding year; and then there may be danger, though it be had from ever so proper a land. It is a rule among the farmers, never to buy seed-wheat from a sandy soil; they express their dislike of this by the coarse rhime; sand is a change for no land.

*Steeping of* SEED. See the article SMUT.

SEEDLINGS, among gardeners, denote such roots of gilliflowers, &c. as come from seed sown. Also the young tender shoots of any plants that are newly sown.

SEEDY, in the brandy-trade, a term used by the dealers, to denote a fault that is found in several parcels of french brandy, which renders them unsaleable. The French suppose that these brandies obtain the flavour which they express by this name, from weeds that grow among the vines from whence the wine of which this brandy is made was pressed. However it be, the thing is evident, and the taste not of any one kind, some tasting strongly of aniseed, some of caraway-seed, and some others of the strong flavoured seeds of plants. The business of rectification of spirits, Dr. Shaw observes, is very little understood abroad, though much practised with us; and there is no doubt but that the same means which we use to rectify malt spirits, would also serve to purify these brandies. See the article RECTIFICATION.

SEEING, the act of perceiving objects by the organ of sight; or it is the sense we have of external objects by means of the eye. See the article SIGHT.

The apparatus, or disposition, of the parts necessary to seeing, as also the obstruction of that sense from whatever cause, may be seen under the article EYE, and the manner wherein seeing is performed under the article VISION.

SEELING, in the manege, a horse is said to seel when he begins to have white eyebrows, that is, when there grows on that part about the breadth of a farthing of white hairs, mixed with those of his natural colour, which is a mark of old age. It is said, that a horse never seels till he is fourteen years old, and always does before he is sixteen years. The light, sorrel, and black sooner seel than any other. Horse-jockeys usually pull out those hairs with pincers, but if there be so many, that it cannot be done without making the horse look bald and ugly, then they colour their eye-brows, that they may not appear old.

SEELING, at sea, is used in the same sense nearly with heeling: when a ship lies down constantly, or steadily on one side, the seamen say, she heels, and they call it seeling when she tumbles violently and suddenly, by reason of the sea forsaking her, as they call it, that is, the waves leaving her for a time in a bowling sea. When a ship thus tumbles to leeward, they call it lee-seel, and in this there is not much danger, even in a storm, because the sea will easily right her up again; but if she rowls or seels to windward, there is fear of her coming over too short or suddenly, and so having the

sea

sea break right into her, be either foundered, or have some of her upper works carried away.

SEES, a city of France, in the province of of Normandy, situated east longitude 20′, north latitude 49° 46′.

SEGEBERG, a town of Germany, in the circle of Lower Saxony, and dutchy of Holstein, situated 27 miles north-east of Hamburg.

SEGEDIN, a city of Upper Hungary, situated on the river Teysse, in east long. 21°, north lat. 46° 21′.

SEGESWAEE, a city of Transylvania, situated east longitude 24°, north latitude 47° 25′.

SEGMENT *of a circle*, in geometry, that part of the circle contained between a chord and an arch of the same circle. See CIRCLE, ARCH, and CHORD.

Thus the portion A F B (pl. CCXLIV. fig. 2. n° 1.) comprehended between the arch A F B, and the chord A B, is a segment of the circle A B F D. As it is evident every segment of a circle must either be greater or less than a semicircle, the greater part of the circle cut off by a chord. *i. e.* the part greater than a semicircle, is called the greater segment, as A D E B, and the lesser part, or the part less than a semicircle, the lesser segment, as A F B.

From what has been said under CIRCLE it appears, that the area of the sector ABCD, n° 2. is produced by multiplying half of the arch into the radius, and likewise that the area of the segment A D C is found by subtracting from the area of the sector, the area of the triangle A B C. See the article SECTOR.

SEGMENT *of a sphere*, is a part of a sphere terminated by a portion of its surface, and a plane which cuts it off, passing somewhere out of the center; being more properly called the section of a sphere.

The base of such a segment, it is evident, is always a circle for finding the solid contents of the segment of a sphere. See the article FRUSTUM.

SEGMENT is sometimes also extended to the parts of the ellipses, and other curvilinear figures.

*Line of* SEGMENTS. See SECTOR.

SEGMENTUM, among the Romans, an ornament of lace, used by the women on their shoulders, which according to some, resembled our shoulder-knots.

Segmenta were also a kind of tessellated or mosaic pavements, made up of pieces of various shapes and colours, but which had an uniform and regular arrangement.

SEGMOIDAL, *valves*, in anatomy, little valves of the pulmonary artery, thus called from their resembling segments of circles, but more usually called semilunar valves.

SEGORBE, a city of Spain, in the province of Valencia, situated thirty miles north-west of Valencia.

SEGOVIA, a city of Manila, the largest of the Philippine Islands, situated in east long. 119°, north lat. 18° 30′.

This is also the name of a city of Spain, in the province of Old Castile, situated west long. 4° 35′, north lat. 41°.

SEGRA, a river of Spain, which rising in the north of Catalonia, and running south-west, discharges itself into the Ebro, at Miquinenca.

SEGREANT is the herald's word for a griffon, when drawn in a leaping posture, and displaying his wings as if ready to fly.

SEGUE, in the italian music, is often found before *aria*, *alleluja*, *amen*, &c. to shew that those portions or parts are to be sung immediately after the last note of that part over which it is writ; but if these words *si piace*, or *ad libitum*, are joined therewith, it signifies, that these portions may be sung or not, at pleasure.

SEGURA, a town of Portugal, in the province of Beira, ten miles north-west of Alcantara. This is also the name of a town in Spain, in the province of New Castile, and territory of La Mancha, situated among the mountains of Segura, west long. 2° 50′, north lat. 38° 25′.

SEJANT, a term used in heraldry, when a lion, or other beast, is drawn in an escutcheon, sitting like a cat, with his fore-feet strait.

SEIGNIORY, *dominium*, in our law, is used for a manor or lordship of a seigneur, or lord of the fee or manor.

SEIGNORAGE, signifies the right, or due belonging to a seigneur, or lord; but it is particularly used for a duty belonging to the prince, for the coining of money; called also coinage, which under our antient kings, was five shillings for every pound of gold brought in the mass to be coined, and a shilling for every pound weight of silver. At present the king claims no seignorage at all, but the subject has his money coined at the public expence;

expence; nor has the king any advantage therefrom, but what he has from the alloy. See the article COINING.

SEISIN, in law, fignifies poffeffion. See the article POSSESION.

In this fenfe we fay, premier feifin, for the firft poffeffion.

Seifin is divided into that in deed or in fact, and that in law; a feifin in deed is where a poffeffion is actually taken; but a feifin in law is, where lands defcend, and the party has not entered thereon; or in other words, it is, where a perfon has a right to lands, *&c.* and is by wrong diffeifed of them. A feifin in law is held to be fufficient to avow on; though to the bringing of an affife, actual feifin is required; and where feifin is alledged, the perfon pleading it, muft fhew of what eftate he is feifed, *&c.* See the article LIVERY *of feifin.*

Seifin of a fuperior fervice, is deemed to be a feifin of all inferior and cafual fervices, that are incident thereto; and feifin of a leffee for years, is fufficient for him in reverfion.

SEISINA *habenda quia rex habuit annum, diem et vaftum,* a writ which lies for delivery of feifin to the lord of lands or tenements, forfeited by a felon, after the king, in right of his prerogative, has had the year, day, and wafte therein.

SEISINAM *habere facias.* See the article HABERE FACIAS.

SEISOR. See the article DISSEISOR.

SEIZE, SEAZE, or SEASE, in the fea-language, is to make faft, or bind, particularly to faften two ropes together, with rope-yarn. The feizing of a boat is a rope tied to a ring, or little chain in the fore fhip of the boat, by which means it is faftened to the fide of the fhip.

SEIZING, in falconry, is when a hawk gripes her prey, or any thing elfe faft between her claws.

SEIZURE, in commerce, an arreft of fome merchandize, moveable, or other matter, either in confequence of fome law, or of fome exprefs order of the fovereign. Contraband goods, thofe fraudulently entered, or landed without entering at all, or at wrong places, are fubject to feizure. In feizures, among us, one half goes to the informer, and the other half to the king.

SELAGO, in botany, a genus of the didynamia-angiofpermia clafs of plants, the corolla whereof is monopetalous; the tube is very fmall, and fcarcely perforated; the limb is patent, quinquifid, and almoft equal; there is no pericarpium, the corolla invefting the feed, which is fingle and roundifh.

SELBY, a town of Yorkfhire, fituated ten miles fouth of York.

SELENDERS, in the manege, are chops, or mangy fores, in the bending of a horfe's hough, as the malanders are in the knees. See MALANDERS.

SELENEUSIAN EARTH, in natural hiftory, a loofe, friable light and white marle, called by late authors, mineral-agaric. See the article AGARIC.

SELENITÆ, MOON STONE, in natural hiftory, a clafs of foffils, naturally and effentially fimple, not inflammable nor foluble in water, compofed of flender filaments, ranged into fine and even thin flakes, and thofe difpofed into regular figures, in the different genera, approaching to a rhomboide, a hexangular column, or a rectangled inequilateral parallelogram, fiffil like the talcs, but that not only horizontally, but perpendicularly alfo, flexile in a fmall degree, but not at all elaftic; not fermenting with acid menftrua, and readily calcining in the fire.

Of this clafs, Dr. Hill makes feven orders, and under thefe orders ten genera. The firft order is the felenitæ, with horizontal plates, approaching to a rhomboidal form; the fecond order is the felenitæ with horizontal plates, of a columnar and angular form; the third order comprehends thofe felenitæ whofe filaments are vifibly arranged into plates, but in the whole maffes appear ftriated, not tabulated; of the fourth order, are the flat felenitæ, of no determinately angular figure; of the fifth order, are the felenitæ formed of plates perpendicularly arranged; of the fixth order are thofe felenitæ formed of a congeries of plates, ranged in form of a ftar; and of the feventh order are thofe felenitæ of a complex and indeterminate figure. This foffil is found in ftrata of clay ufually of the blue tough kind; we have it in many parts in England, particularly about Shotover hills in Oxfordfhire; in feveral places of Northamptonfhire, Leicefterfhire, and about Epfom, in Surry. In medicine, it is a very powerful aftringent, and is of effect in diarrhœas, dyfenteries, and hæmorrhages of all kinds. It ftands alfo recommended as a cofmetic. The people of Northamptonfhire call it ftaunch, and ufe it in hæmorrhages of all kinds, with fuccefs.

SELENOGRAPHY, a branch of cofmography, which defcribes the moon and all the parts and appearances thereof, as geography does thofe of the earth. See the article MOON.

SELEUCIDÆ, in chronology. Æra of the feleucidæ, or the fyro-macedonian æra, is a computation of time, commencing from the eftablifhment of the feleucidæ, a race of greek kings, who reigned as fucceffors of Alexander the Great, in Syria, as the Ptolomies did in Egypt. This æra we find expreffed in the book of the Maccabees, and on a great number of greek medals, ftruck by the cities of Syria, &c. The rabbins call it the æra of contracts; and the Arabs therik dilkarnain, that is, the æra of the two horns. According to the beft accounts, the firft year of this æra falls in the year 311 before Chrift, being twelve years after Alexander's death.

SELINGENSKOY, a town of Afiatic Mufcovy, in the province of Siberia, fituated on the road from Tobolfki to China, on the river Selinga: in eaft long. 95°, north lat. 50°.

SELINUM, in botany, a genus of the pentandria digynia clafs of plants, the general corolla whereof is uniform; the fingle flowers confift each of five unequal inflexo-cordated petals; there is no pericarpium: the fruit is of an elliptico-oblong, compreffo-plane figure, ftriated each way in the middle, and feparable into two parts; the feeds are two, of an oblong elliptic figure, plane on each fide, and edged with membranaceous rims at the fides.

SELKIRK, a borough town of Scotland, in the county of Tweedale, fituated 32 miles fouth of Edinburgh.

SELL, in building, is of two kinds, *viz.* ground-fell, which denotes the loweft piece of timber, in a timber-building, and that on which the whole fuperftructure is raifed; and the window-fell, called alfo window-foil, is the bottom piece in a window-frame.

SELLA EQUINA, TURCICA, or SPHENOIDES, a name given to the four apophyfes of the os fphenoides, or cruciforme, in the brain, in regard of their forming a refemblance of a faddle, which the Latins call *fella*. They are fometimes called by the greek name *clinoides*. Herein are contained the pituarity gland, and in fome animals, the rete mirabile.

SELTZER *water*, the name of a mineral-water of Germany, which arifes near Neider Seltz, and is now ufed in England and many other countries. We call it feltz, or faltzer-water, and the phyficians prefcribe it in many cafes, as fcurvies, fpafmodic affections, and in confumptions; in the laft cafe, mixing it with affes milk.

SEMEIOTICA, or SEMEIOSIS, σημειωτικη, that part of medicine which confiders the figns or indications of health and difeafes, and enables the phyfician to judge what is, was, or will be, the ftate, degree, order, and effect, of health or ficknefs.

SEMENDRIA, a town of european Turky, in the province of Servia, fituated on the Danube, thirty miles fouth-eaft of Belgrade.

SEMENTINÆ FERIÆ, in antiquity, feafts held annually among the Romans, to obtain of the gods a plentiful harveft. They were celebrated in the temple of Tellus, where folemn facrifices were offered to Tellus and Ceres. Thefe feafts were held about feed-time, ufually in the month of January; for Macrobius obferves, they were moveable feafts. They had their name from *femen*, feed.

SEMETS, SUMMETS, or SUMMITS, in botany, the fame with the antheræ. See article ANTHERÆ.

SEMI, a word borrowed from the latin, fignifying *half*, but only ufed in compofition with other words, as in the following articles.

In mufic, femi has three feveral ufages; firft, when prefixed to the name of a note, it expreffes a diminution of half its value, as in femi-breve, &c. Secondly, when added to the name of an interval, it expreffes a diminution, not of half, but of a leffer femi-tone, or four commas in the whole compafs, as in femi-diapente, &c. Thirdly, it fometimes alfo fignifies an imperfection, thus, femi-circolo, or circolo-mezzo, fignifies an imperfect circle, which is the mark of imperfect time, that is, of double time; whereas the circle being a character of perfection, marks triple time.

Semi-breve is a note or meafure of time, comprehending the fpace of two minims, or four crotchets, or half a breve. See MINIM, CROTCHET, &c.

The femi-breve is accounted one meafure or time, or the integer in fractions and multiples, whereby the time of the other notes is expreffed: thus a minim is expreffed by $\frac{1}{2}$, a crotchet by $\frac{1}{4}$, &c. that is, by $\frac{1}{4}$ of a meafure or femi-breve; a breve by two, and a long by four;

four; that is, by four meafures or femibreves.

For the femi-chroma, fee the articles CHROMA and QUAVER. For the femicircolo, fee CIRCOLO-MEZZO. For the femi-diapafon, femi diapente, femi-diateffaron, fee the articles DIAPASON, DIAPENTE, &c.

And for the femi-tone and femi-tonic, fee the articles SEMI-TONE and SEMI-TONIC SCALE.

For the feveral characters of the femibreve, &c. fee the article CHARACTER.

SEMI-ARIANS, in church-hiftory, a branch of the antient arians, confifting of fuch as in appearance condemned the errors of that herefiarch, but yet acquiefced in fome of the principles thereof, only palliating and concealing them under fofter and more moderate terms. They would not allow, with the catholics, that the fon was homoouſios, *i. e.* of the fame fubftance, but homoiouſios, *i. e.* of a like fubftance, with the father; and thus, though, in expreffion, they differed from the orthodoxy in a fingle letter only, yet, in effect, they denied the divinity of Jefus Chrift, and placed him in the rank of creatures.

SEMI-CIRCLE, in geometry, half a circle, or that figure comprehended between the diameter of a circle and half the circumference. See the article CIRCLE.

SEMI-CIRCLE is alfo an inftrument ufed in furveying, otherwife called graphometer. See the article GRAPHOMETER.

SEMI-COLON, in grammar, one of the points or ftops ufed to diftinguifh the feveral members of fentences from each other. See PUNCTUATION.

The mark, or character, of the femicolon is ( ; ) and has its name as being fomewhat of lefs effect than a colon, or as demanding a fhorter paufe. The ufe of the femi-colon, the grammarians generally fay, is to mark a fenfe lefs complete than the colon, and more complete than a comma; but this conveys a very obfcure idea: befides, our beft writers feem to ufe them promifcuoufly. See COLON.

But Mr. Ward, who is faid to have firft fettled a juft ufe of the femi-colon, holds, that it is properly ufed to diftinguifh the conjunct members of fentences. Now by a conjunct member of a fentence, he means fuch a one as contains at leaft two fimple members. Whenever then a fentence can be divided into feveral members of the fame degree, which are again divifible into other fimple members, the former are to be feparated by a femicolon. But though the proper ufe of the femi-colon be to diftinguifh conjunct members, it is not neceffary that all the members divided hereby be conjunct; for upon dividing a fentence into great and equal parts, if one of them be conjunct, all thofe other parts of the fame degree are to be diftinguifhed by a femicolon. See the article SENTENCE, &c.

SEMI-CUBICAL *parabola*, in the higher geometry, a curve of the fecond order, wherein the cubes of the ordinates are as the fquares of the abfciffes. Its equation is $axx = y^3$.

SEMI-CUPIUM, in medicine, an half-bath, wherein the patient is only placed up to the navel.

SEMI-DIAMETER, half the diameter, or a right line drawn from the center of a circle, or fphere, to its circumference; being the fame with what is otherwife called the radius. See the article RADIUS.

The diftances, diameters, &c. of the heavenly bodies, are ufually eftimated, by aftronomers, in femi-diameters of the earth; and the diftances of the fecondary planets from their refpective primary ones, by femi-diameters of the body of the primary planet. See DISTANCE, DIAMETER, and PLANET.

SEMI-DOUBLE, in the romifh breviary, a term applied to fuch offices and feftivals as are celebrated with lefs folemnity than the double ones, but yet with more than the fingle ones. The femi-double office has double vefpers, and nine leffons at mattins, but the anthems are not redoubled. It is performed on Sundays, on the octaves; and on feafts, marked for femi-double in the calendar.

SEMIFLOSCULOUS, in botany, a term ufed to exprefs the flowers of a certain clafs of plants, of which the dandelion, hawk-weed, and the like, are kinds. Thefe femiflofcules are petals, hollow in their lower part, but in their upper flat, and continued in the fhape of a tongue. See the article FLOSCULOUS.

SEMIGALIA, the eaftern divifion of the dutchy of Courland in Poland.

SEMI-INTEROSSEUS INDICIS, in anatomy, a fmall, fhort, flat mufcle, very like the antithenar, or internal femiinteroffeus of the thumb. It is fituated obliquely on one fide of that of the thumb, between the firft phalanx thereof and the firft metacarpal bone. It is fixed by one end to the outfide of the bafis of the firft phalanx of the thumb, and by the

the other end it is fixed near the head of the firſt phalanx of the index, on that ſide next the thumb.

SEMI-LUNAR VALVES, in anatomy, are three ſmall valves, or membranes, of a ſemi-lunar figure, placed in the orifice of the pulmonary artery, to prevent the relapſe of the blood into the heart at the time of its dilatation. See HEART.

SEMI-MEMBRANOSUS, in anatomy, a long, thin muſcle, partly tendinous, ſituated on the backſide of the thigh, a little towards the inſide; being one of the five flexors of the tibia. It ariſes from the tubercle of the iſchium.

SEMI-ORDINATE, in conics, &c. the half of an ordinate. See ORDINATE.

SEMI-PARABOLA, in geometry, a curve defined by the equation $ax^{m-1}=y^m$; as $ax^2=y^3$, and $ax^3=y^4$. See the article PARABOLA.

In ſemi-parabolas, $y^m : v^m :: ax^{m-1} : az^{m-1} = x^{m-1} : z^{m-1}$; or the powers of the ſemi-ordinates are, as the powers of the ſemi-abſciſſes one degree lower; for inſtance, in cubical ſemi-parabolas the cubes of the ordinates are as the ſquares of the abſciſſes; that is, $y^3 : v^3 :: x^2 : z^2$.

SEMI-PELAGIANS, in church-hiſtory, a branch of the pelagians, ſo called becauſe they pretended to keep a medium between the pelagians and the orthodox. See the article PELAGIANS.

SEMI-PROOF, or HALF-PROOF, in matters of law. See the article PROOF.

SEMI-QUARTILE, or SEMI-QUADRATE, the ſame with octant. See OCTANT.

SEMI-QUAVER, in muſic. See QUAVER.

SEMI-QUINTILE, an aſpect of the planets when thirty-ſix degrees from each other. See the article ASPECT.

SEMI-SEXTILE, marked S. S. is an aſpect of two planets when diſtant only thirty degrees.

SEMI-TONE, in muſic, one of the degrees or concinnous intervals of concords. The ratio of the ſemi-tone is 15 : 16. See the article TONE.

SEMI-TONIC *ſcale*, a ſcale, or ſyſtem of muſic, conſiſting of twelve degrees in the octave, being an improvement of the diatonic-ſcale, by inſerting between each two notes thereof another note, which divides the interval or tone into two unequal parts called ſemi-tones. See the article DIATONIC.

SEMINAL, *ſeminalis*, in anatomy and medicine, ſomething belonging to the ſemen, or ſeed. See the articles SEED and SPERMATIC.

SEMINARY, a kind of college, or ſchool, where youth are inſtructed in the ceremonies, &c. of the ſacred miniſtry, of which there are many abroad; it being ordained, by the council of Trent, that there be a ſeminary belonging to each cathedral, under the direction of the biſhop.

In the reign of queen Elizabeth, the roman catholics projected the founding engliſh ſeminaries abroad, in order from thence to be furniſhed with miſſionaries to perpetuate and increaſe their communion in Britain. But, by a ſtatute of that princeſs, it is made a premunire to contribute to the maintenance of a popiſh ſeminary: and by one of James I. no perſons are to go, or be ſent, to popiſh ſeminaries, to be inſtructed or educated, under divers penalties and diſabilities mentioned in the ſtatute.

SEMINARY, in gardening, denotes the ſeed-plot, or place allotted for raiſing plants from ſeed, and keeping them till they are fit to be removed into the garden or nurſery.

When the ſeminary is intended for trees, it muſt be large, and of a ſoil adapted to the generality of the trees intended to be raiſed in it: but that which is moſt in uſe is for the ſupply of the flower-garden, and is the place where flowers are to be raiſed from their ſeeds, to procure varieties; or, as the floriſts expreſs it, new flowers; as alſo for the ſowing all the biennial plants, to ſucceed thoſe which decay in the flower-garden.

The ſeminary ſhould always be ſituated at ſome diſtance from the houſe, and be walled or paled round, and kept under lock and key, to keep out dogs, &c. and to prevent a great deal of damage that is frequently done by thoſe who are not acquainted with gardening, before they are aware of it. The ſeveral directions for the management of the ſeminary, are to be ſeen under the names of the ſeveral plants intended to be raiſed in it.

SEMINATION, in natural hiſtory, denotes the manner, or act, of ſhedding and diſperſing the ſeeds of plants, which is effected ſeveral ways. Some are heavy enough to fall directly to the ground; others are furniſhed with a pappus, or down, that they may, by means thereof, be diſperſed by the wind; and others again

again are contained in elaftic capfules, which burfting open with confiderable force, dart or throw out the feeds to different diftances.

SEMINERVOSUS, in anatomy, one of the flexor mufcles of the leg, which arifes from the ifchium, and is inferted into the upper part of the tibia.

SEMIS, in roman antiquity, the half of an as. See the article As.

SEMISPINALIS, or SEMISPINOSUS, in anatomy, one of the extenfor mufcles of the back and loins, has its origin from the os facrum and vertebræ of the loins, and its termination at the upper vertebræ of the thorax, efpecially at their fpinofe apophyfes: it coheres very firmly to the longiffimus dorfi and facro-lumbaris, the other two extenfors of the back and loins.

SEMITA LUMINOSA, a name given to a lucid tract in the heavens, which may be feen about fix o'clock at night, a little before the vernal equinox, extending from the weftern edge of the horizon up towards the pleiades.

Caffini and Facio have both obferved this phænomenon; the former thinks it arifes from a vaft number of fmall planets encompaffing the fun, which give this light from reflection.

SEMLIN, or ZEMLIN, a town of Sclavonia, fubject to the houfe of Auftria, eaft long. 21°, and north lat. 45°.

SEMPERVIVUM, in botany, a genus of the dodecandria-polygynia clafs of plants, the corolla whereof confifts of twelve oblong, lanceolated, acute, hollow petals, a little larger than the cup; the fruit confifts of twelve oblong compreffed capfules, placed in an orbicular order, acuminated outwards, and opening internally; the feeds are numerous, roundifh, and fmall.

This genus comprehends the great houfeleek and the tree-houfeleek.

This plant ftands recommended as a cooler; though its fenfible qualities difcover no great foundation for any virtue of this kind.

SEMUR, the name of two towns of Burgundy, in France, one thirty-four miles weft of Dijon, and the other forty fix miles north-weft of Lyons.

SENA, or SENNA, in botany, a fhrub with crooked and compreffed fruit, and lanceolated pinnæ: it is a fpecies of caffia. See the article CASSIA.

Sena-leaves are much ufed for their purgative virtue; but are apt to gripe, unlefs given with proper correctives, as coriander, anifeed, ginger, raifins, and falt of tartar; which are added to the infufion of the leaves, occafionally: but there is no corrective fo effectual, as diluting it with a large quantity of the liquid its infufion is taken in, as broth or water-gruel. This, and the method of correcting it by the alkaline falts, are the only proper ones; becaufe they have it in full force as a purgative, and indeed rather add to it than otherwife. In inflammatory cafes, hæmorrhages, and diforders of the breaft, fena is to be avoided as a purge; but, in all other cafes, it is a fafe and excellent cathartic.

The pods of fena are alfo purgative, and are obferved to gripe the patient lefs; but then they alfo purge lefs, fo that they require to be given in a much larger dofe, and even then operate but languidly.

SENATE, *fenatus*, in general, is an affembly, or council, of fenators; that is, of the principal inhabitants of a ftate, who have a fhare in the government.

The fenate of antient Rome is, of all others, the moft celebrated: it exercifed no contentious jurifdiction, but appointed judges, either from among the fenators or knights, to determine proceffes: it alfo appointed governors of provinces, and difpofed of the revenues of the commonwealth, &c. Yet did not the whole fovereign power refide in the fenate, fince it could not elect magiftrates, make laws, or decide of war and peace; in all which cafes the fenate was obliged to confult the people.

According to Dr. Middleton, the conftant and regular fupply of the fenate was from the annual magiftrates; who, by virtue of their feveral offices, acquired a right to fit and vote in that affembly: the ufual gradation of thefe offices being that of quæftor, tribune of the people, ædile, prætor, and conful. See the articles QUESTOR, TRIBUNE, &c.

But though thefe offices gave both an immediate right, and actual entrance into the fenate; yet the fenatorial character was not efteemed complete, till the new fenators had been enrolled by the cenfors, at the next general luftrum, or review of all the orders of the city. See the articles CENSOR and LUSTRUM.

The fenate always met of courfe on the firft of January, for the inauguration of the new confuls; and in all months univerfally, there were three days, *viz.* the calends, nones, and ides, on which it regularly

regularly met: but it always met on extraordinary occasions, when called together by consul, tribune, or dictator.

SENATOR, in general, denotes a member of some senate.

SENATUS AUCTORITAS, a vote of the roman senate, drawn up in the same form with a decree, but without its force, as having been hindered from passing into a decree, by some of the tribunes of the people.

SENATUS CONSULTUM, a decree of the roman senate, pronounced on some question or point of law; which, when passed, made a part of the roman law. See the article CIVIL LAW.

SENECA, or SENEGA. See SENEGA.

SENECIO, GROUNDSEL, in botany, a genus of the syngenesia-polygamia-superflua class of plants, with a flosculous flower, contained in a one-leaved cup; there is a single downy seed, after each floscule.

Common groundsel, taken in a strong infusion, is emetic: it is prescribed in small doses in the jaundice, dropsy, and hæmorrhages; and externally it is used in ointments, for disorders of the skin.

SENEF, a town on the confines of Hainault, twelve miles east of Mons.

SENEGA, or SENEGAL, a river of Negroland, in Africa, which falls into the Atlantic ocean, in 16° north lat. whence the gum senega is imported. See the article GUM.

SENEGA, SENECA, or SENEKA, RATTLE-SNAKE-ROOT, in the materia medica. See the article SERPENTARIA.

SENESCHAL, *seneschallus*, a term anciently used for steward, or majordomo. See the article STEWARD.

SENEZ, a town of Provence, in France, forty-six miles north-east of Aix.

SENLIS, a town of the Isle of France, twenty-six miles north of Paris.

SENNA, or SENA. See the article SENA.

SENNE, a river of the austrian Netherlands, which, rising in Hainault, passes by Brussels, and falls into the Demer, below Mechlin.

SENOPLE, or SINOPLE. See SINOPLE.

SENS, a town of Champain, in France, situated on the river Yonne, sixty miles south-east of Paris.

SENSATION, in philosophy, the art of perceiving external objects, by means of the senses. See the articles SENSE and PERCEPTION.

SENSE, a faculty of the soul, whereby it perceives external objects, by means of the impressions they make on certain organs of the body. These organs of sensation are commonly reckoned five, *viz.* the eye, whereby we see objects; the ear, which enables us to hear sounds; the nose, by which we receive the ideas of different smells; the palate, by which we judge of tastes; and the cutis, or skin, which enables us to feel the different forms, hardness, or softness of bodies. See the articles EYE, EAR, &c. as also VISION, HEARING, &c.

Some also give the name of internal senses to the determinations of the mind to be pleased with certain forms and ideas, perceived by the means of corporeal organs of sense; and hence they use the term moral sense, for a determination of the mind to be pleased with the contemplation of those affections, actions, or characters, which we call virtuous.

SENSITIVE SOUL, a denomination given to the souls of brutes, either as intimating its utmost faculty to be that of sensation; or because it is supposed to be corporeal, so as to be an object of our senses. See the article SOUL.

SENSITIVE PLANT, *mimosa*, in botany, a genus of the polyandria-monogynia class of plants, with a small, funnel-fashioned, semi-quinquifid flower: its fruit is a long pod, containing a great many roundish seeds.

This genus comprehends the mimosa or sensitive plant, the acacia of Tournefort, and the inga of Plumier.

The sensitive plant is so denominated from its remarkable property of receding from the touch, and giving signs, as it were, of animal life and sensation: this motion it performs by means of three distinct articulations, *viz.* of a single leaf with its pedicle, of the pedicle to its branch, and of the branch to the trunk or main stem; the primary motion of all which is the closing of the two halves of the leaf on its rib; then the rib or pedicle itself closes; and if the motion wherewith the plant is moved be very strong, the very branches have the sensation propagated to them, and apply themselves to the main stem, as the simple leaves did before to their ribs, and these ribs to their branches; so that the whole plant, in this state, forms itself, from a very complexly branched figure, into a sort of straight cylindrical one.

SENSORY, *sensorium commune*, the seat of the common sense, or what receives the impressions of all sensible objects, conveyed to it by the nerves of each particular

ticular organ, and confequently is the immediate caufe of perception. This office is, by Dr. Willis, attributed to the ftriated part of the brain; and by Des Cartes to the glandula pinealis.

SENTENCE, in law, a judgment paffed in court by the judge, on fome procefs, either civil or criminal.

SENTENCE, in grammar, a period or fet of words, comprehending fome perfect fenfe or fentiment of the mind. See the article POINTING.

SENTENCE, in poetry, is an inftructive and lively remark made on fomething very obfervable and agreeably furprifing, which contains much fenfe in few words.

It is either direct or plain, as, "In all the affairs of the world, fo much reputation is really fo much power;" or indirect or difguifed, as,

"Fool, not to think how vain
Againft th' Omnipotent to rife in arms."

This is a very dexterous and prevailing way of bringing in a fentence. You are entertained with a noble reflection, when you did not expect it; and pleafantly furprized and inftructed, without the appearance or formality of art. Not to come down to ufelefs nicety and diftinction, a fentence appears with moft beauty and advantage, when it is put into fome of thefe following forms.

1. When it is expreffed in any way of exclamation, but peculiarly of wonder or indignation: as,

"How advantageous is it to pafs thro' adverfities, to the enjoyment of profperity!"

"How fharper than a ferpent's tooth it is, to have a thanklefs child!"

2. When it is put into a moving expoftulation, or preffing interrogation.

"Are thefe our fcepters? thefe our due rewards?
And is it thus that Jove his plighted faith regards?"

3. When the fentence is delivered, and a reafon immediately added to fupport it. "In a government, it is much better to be unmindful of good fervices than bad; for a good man only becomes more flow, when you take no account of him; a bad man, more daring and infolent."

4. When a fentence is made up of a fhort relation, and a clean and pertinent remark upon it.

"Meffalina defired the name of matrimony (with her adulterer Silius) purely for the greatnefs of the infamy; which is the laft pleafure of profligate people." And this is near a-kin to the epiphonema. See EPIPHONEMA.

Sentences muft not ftand aukward and bulky out of the difcourfe, but be neatly interwoven and wrought into it. They muft be unaffected and fignificant, and fuch as the fubject eafily fuggefts to a thoughtful and diftinguifhing man. Sentences are the ornaments and lights of a difcourfe; and therefore, as lights and fhades are in a good picture, fo ought fentences to be fo exactly and judicioufly mixed with the other parts of the difcourfe, that all together may make up one uniform beauty, one regular and confummate piece.

SENTIMENTS, in poetry, and efpecially dramatic, are the thoughts which the feveral perfons exprefs, whether they relate to matters of opinion, paffion, bufinefs, or the like.

SENTINEL, CENTINEL, or CENTRY, in military affairs, is a private foldier, placed in fome poft, to watch any approach of the enemy, to prevent furprizes, and to ftop fuch as would pafs without order, or difcovering who they are.

SEPARATION, a term fometimes ufed for what is more ufually called departure. See the article DEPARTURE.

SEPARATISTS, an appellation given to diffenters, from their fetting up a feparate church from the eftablifhed one. See the articles CHURCH and DISSENTERS.

SEPIA, the INK FISH, or CUTTLE FISH, in zoology, a genus of remarkable fea-infects, of an oblong figure, and depreffed: it has ten tentacula, two of which are longer than the reft, and are pedunculated.

There are feveral fpecies of this animal, different in fize and other properties: but that properly called the cuttle-fifh is about fix inches in length and three and a half in diameter; and is fupported by an oblong, light, and fpongy fubftance, of a friable texture, and lined with a light fungous pith: this is what our filverfmiths ufe, under the name of cuttle-bone; and is alfo ufed in tooth-powders, as a dentrifice. This animal is frequent in the european feas, but is not common on our coafts: when in danger of being taken, it is faid to emit at its mouth a liquor of a black colour, like ink, in a confiderable quantity, which obfcures the water about it, and gives it an opportunity of efcaping.

SEPS, in zoology, a fpecies of lizard, with longitudinal black lines: its bite is faid to be very fatal. See the article LIZARD.

SEPTA OVILIA, in roman antiquity. See the article OVILIA.

SEPTARIÆ, in natural hiftory, a large clafs of foffils, commonly known by the names of ludus Helmontii and waxen veins.

They are defined to be foffils not inflammable, nor foluble in water; of a moderately firm texture, and dufky hue, divided by feveral fepta, or thin partitions, and compofed of a fparry matter greatly debafed by earth, not giving fire with fteel, fermenting with acids, and in great part diffolved by them, and calcining in a moderate fire.

Of this clafs there are two diftinct orders of bodies, and under thofe fix genera. The feptariæ of the firft order are thofe which are ufually found in large maffes, of a fimple uniform conftruction, but divided by large fepta either into larger and more irregular portions, or into fmaller and more equal ones, called talc. The genera of this order are four: 1. Thofe divided by fepta of fpar, called fecomiæ. 2. Thofe divided by fepta of earthy matter, called gaiophragmia. 3. Thofe divided by fepta of the matter of the pyrites, called pyritercia. And, 4. Thofe divided by fepta of fpar, with an admixture of cryftal, called diaugophragmia. See all thefe under their feveral heads.

Thofe of the fecond order are fuch as are ufually found in fmaller maffes, of a cruftated ftructure, formed by various incruftations round a central nucleus, and divided by very thin fepta. Of this order are only two genera: 1. Thofe with a fhort roundifh nucleus, enclofed within the body of the mafs. And, 2. Thofe with a long nucleus, ftanding out beyond the ends of the mafs.

SEPTEMBER, the ninth month of the year, confifting of only thirty days: it took its name as being the feventh month, reckoning from March, with which the Romans began their year. See the articles YEAR and MONTH.

SEPTENTRIO, in aftronomy, a conftellation more ufually called urfa minor. See the article URSA.

In cofmography, the term feptentrio denotes the fame with north: and hence, feptentrional is applied to any thing belonging to the north, as feptentrional figns, parallels, &c. See SIGN, &c.

SEPTIER, or SETIER, a french meafure of capacity. See MEASURE.

SEPTIZON, or SEPTIZONIUM, in roman antiquity, a celebrated maufoleum, built by Septimus Severus, in the tenth region of the city of Rome: it was fo called from *feptem* and *zona*, by reafon it confifted of feven ftories, each of which was furrounded by a row of columns.

SEPTUAGESIMA, in the calendar, denotes the third Sunday before lent, or before quadragefima Sunday: fuppofed by fome to take its name from its being about feventy days before eafter.

SEPTUAGINT, the name given to a greek verfion of the books of the Old Teftament, from its being fuppofed to be performed by feventy-two Jews, who are ufually called the feventy interpreters, becaufe feventy is a round number.

The hiftory of this verfion is exprefly written by Arifteas, an officer of the guards to Ptolemy Philadelphus, the fubftance of whofe account is as follows: Ptolemy having erected a fine library at Alexandria, which he took care to fill with the moft curious and valuable books from all parts of the world, was informed that the Jews had one, containing the laws of Mofes, and the hiftory of that people, and being defirous of enriching his library with a greek tranflation of it, applied to the high-prieft of the Jews; and to engage him to comply with his requeft, fet at liberty all the Jews, whom his father Ptolemy Soter had reduced to flavery. After fuch a ftep, he eafily obtained what he defired; Eleazar, the jewifh high-prieft, fent back his embaffadors with an exact copy of the mofaical law, written in letters of gold, and fix elders of each tribe, in all feventy-two, who were received with marks of refpect by the king, and then conducted into the ifle of Pharos, where they were lodged in a houfe prepared for their reception, and fupplied with every thing neceffary in abundance. They fet about the tranflation without lofs of time, and finifhed it in feventy-two days; and the whole being read in the prefence of the king, he admired the profound wifdom of the laws of Mofes; and fent back the deputies, laden with prefents for themfelves, the high prieft, and the temple.

This verfion was in ufe to the time of our bleffed Saviour, and is that out of which all the citations in the New Teftament, from the Old, are taken. It was alfo the ordinary and canonical tranflation

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made ufe of by the chriftian church in the earlieft ages; and it ftill fubfifts in the churches both of the eaft and weft. It is however obfervable, that the chronology of the feptuagint is different from the hebrew text. See the article EPOCHA.

SEPTUM, in anatomy, an inclofure, or partition, a term applied to feveral parts of the body, which ferve to feparate one part from another: as, 1. The feptum lucidum, or pellucidum, is a partition which feparates the upper ventricles of the brain, and is compofed of a fine medullary fubftance, formed into two fides, with a longitudinal cavity between them. 2. Septum cordis, a feparation between the two ventricles of the heart, which is about a finger thick, of the fame fubftance with the heart itfelf, and confifting of mufcular fibres, which affift it in all its motions. For the feptum tranfverfum, feptum narium, feptum of the fcrotum, *&c.* fee DIAPHRAGM, NOSE, SCROTUM, *&c.*

SEPULCHRAL, fomething belonging to fepulchres or tombs: thus a fepulchral column is a column erected over a tomb, with an infcription on its fhaft; and fepulchral lamps, thofe faid to have been found burning in the tombs of feveral martyrs and others.

SEPULCHRE, a tomb, or place deftined for the interment of the dead. This term is chiefly ufed in fpeaking of the burying places of the antients, thofe of the moderns being ufually called tombs.

Sepulchres were held facred and inviolable, and the care taken of them has always been held a religious duty, grounded on the fear of God, and the belief of the foul's immortality. Thofe who have fearched or violated them, have been thought odious by all nations, and were always feverely punifhed.

The Egyptians called fepulchres, eternal houfes, in contradiftinction to their ordinary houfes or palaces, which they called inns, on account of their fhort ftay in the one, in comparifon of their long abode in the other.

*Regular canons of St.* SEPULCHRE, a religious order, formerly inftituted at Jerufalem, in honour to the holy fepulchre, or the tomb of Jefus Chrift.

Many of thefe canons were brought from the Holy Land into Europe, particularly into France, by Lewis the younger; into Poland, by Jaxa a Polifh gentleman; and into Flanders by the counts thereof; many alfo came into England. This order was however fuppreffed by pope Innocent VIII. who gave its revenues and effects to that of our Lady of Bethlehem; which alfo becoming extinct, they were beftowed on the knights of St. John of Jerufalem. But the fuppreffion did not take effect in Poland, where they ftill fubfift, as alfo in feveral provinces of Germany. Thefe canons follow the rule of St. Auguftine.

*Knights of the holy* SEPULCHRE, a military order, eftablifhed in Paleftine about the year 1114.

The knights of this order in Flanders, chofe Philip II. king of Spain, for their mafter, in 1558, and afterwards his fon; but the grand mafter of the order of Malta prevailed on the laft to refign: and when afterwards the duke of Nevers affumed the fame quality in France, the fame grand mafter, by his intereft and credit, procured a like renunciation of him, and a confirmation of the union of this order to that of Malta.

SEQUEL, in logic, the fame with conclufion. See the article CONCLUSION.

SEQUENCE, in gaming, a fet of cards immediately following each other, in the fame fuit, as a king, queen, knave, *&c.* and thus we fay, a fequence of three, four, or five cards: but at piquet thefe are called tierces, quarts, quints, *&c.*

SEQUESTRATION, in common-law, is fetting afide the thing in controverfy from the poffeffion of both the parties that contend for it. In which fenfe it is either voluntary, as when done by the confent of the parties; or neceffary, as where it is done by the judge, of his own authority, whether the parties will or not.

A fequeftration is alfo a kind of extent on an execution for debt, in the cafe of a beneficed clergyman, of the profits of his living, directed to the church-wardens, to receive the fame, to fatisfy the judgment.

Sequeftration is granted on a perfon's ftanding out all the proceffes of contempt for non-appearance in the court of chancery, or exchequer, upon a bill exhibited; and alfo where obedience is not yielded to a decree, in which cafe the court grants a fequeftration of the parties lands.

A fequeftration is alfo made in London, upon an action of debt; the courfe of proceeding in which cafe is this: the action being entered, the officer goes to the defendant's fhop or warehoufe, when no perfon is there, and takes a padlock, and hangs it on the door, uttering thefe words:

"I do sequester this warehouse, and the goods and merchandize therein, of the defendant in this action, to the use of the plaintiff," &c. after which he sets on his seal, and makes a return of the sequestration in the compter; and four days being passed after the return made, the plaintiff may, at the next court, have judgment to open the shop or warehouse, and to have the goods appraised by two freemen, who are to be sworn at the next court held for that compter; and then the serjeant puts his hand to the bill of appraisement, and the court grants judgment thereon: but yet the defendant may put in bail before satisfaction, and by that means dissolve the sequestration; and after satisfaction, may put in bail to disprove the debt, &c.

In the time of the civil wars, sequestration was used for a seizing of the estates of delinquents, for the use of the commonwealth.

SEQUESTRATION, in the civil law, is also used in various senses: it is taken for the act of the ordinary in disposing of the goods of a deceased person, which no body will meddle with. A widow is said to sequester, when she disclaims having any thing to do with the estate of her deceased husband. Sequestration is also used to signify the gathering up the fruits of a vacant benefice, for the use of the next incumbent of the church.

SEQUIN, a gold-coin, struck at Venice, and in several parts of the grand feignor's dominions. See the article COIN.

SERAGLIO, a persian word, which signifies the palace of a prince or lord, in which sense the houses of the embassadors of England, France, &c. are, at Constantinople, called their seraglios. But the term seraglio is used, by way of eminence, for the palace of the grand feignor at Constantinople, where he keeps his court, in which his concubines are lodged, and where the youth are trained up for the principal posts of the empire. It is in form of a triangle, about two miles round, at the end of the promontory Chrysoceras, now called the Seraglio-point: the buildings extend to the top of the hill, and from thence there are gardens, that reach to the sea. The outward appearance is not very beautiful, the architecture being irregular, consisting of separate edifices, in the manner of pavilions and domes. The old seraglio is the palace where the grand feignor's old mistresses are kept.

The ladies of the haram, which is the part allotted to the women, is a collection of young beautiful girls, who, on their admission, are committed to the charge of some old lady, and taught music, dancing, and other accomplishments. These frequently play and dance before the grand feignor, while others entertain him with their conversation. Besides these ladies, there are a great many black eunuchs, and female slaves, in the seraglio, whose business it is to guard and wait upon them.

SERAPH, or SERAPHIM, a spirit of the highest rank in the hierarchy of angels; who are thus called from their being supposed to be most inflamed with divine love, by their nearer and more immediate attendance at the throne of God, and to communicate their fervour to the remoter and inferior orders. See the article ANGEL.

SERAPHIC, burning or inflamed with love or zeal, like a seraphim: thus St. Bonaventure is called the seraphic doctor, from his abundant zeal and fervor.

St. Francis, founder of the cordeliers and franciscans, is called the seraphic father, in memory of a pretended vision on mount Alverna, in which, it is said, he saw a seraph glide rapidly from heaven, who impressed on him certain marks, representing the wounds which the nails and spear made in our Saviour's body, at his crucifixion.

SERAPIAS, BASTARD-HELLEBORE, in botany, a genus of the gynandria-diandria class of plants, the flower of which consists of five ovato-oblong petals; and its fruit is an oval unilocular capsule, obtusely trigonal, containing a great many scobiform seeds.

This genus comprehends the helleborine of Tournefort.

SERAVALLE, a town of Italy, in the dutchy of Milan, twenty-four miles north of the city of Genoa.

SERCELLI, a port-town of Algiers, on the coast of Barbary: east long. 4°, and north lat. 37°.

SEREGIPPE, a city and port-town of Brazil, in the bay of All Saints; west long. 39°, and south lat. 11°.

SERENA, the same with coquimbo. See the article COQUIMBO.

*Gutta* SERENA, in medicine. See the article GUTTA SERENA.

SERENADE, a kind of concert given in the night, by a lover to his mistress, under her window. These sometimes only consist

fist of instrumental music, but at other times voices are added: the music and songs composed for these occasions are also called serenades.

SERENE, a title of honour given to several princes, and to the principal magistrates of republics. The king of England, the republic and the doge of Venice, and the children of the king of Spain are called most serene: and when the pope, or the sacred college, write to the emperor, to kings, or the doge, they give them no other title: in like manner the emperor gives no other title to any king, except to the king of France.

Bishops were antiently addressed under the title of serene: and the kings of France, of the first and second race, when speaking of themselves, used no other title but nôtre serenité. The king of Poland and other kings give the title of serene to the electors; but the emperor, on writing to the electors or other princes of the empire, only uses the term dilection; yet in treating with them, he uses electoral serenity to the electors, and ducal serenity to the other princes. The Venetians set the title of serenity above that of highness.

SERGE, in commerce, a woollen stuff manufactured in a loom, of which there are various kinds, denominated either from their different qualities, or from the places where they are wrought; the most considerable of which is the london-serge, which is highly valued abroad, and of which a manufacture has been for some years carried on in France.

In the manufacture of london-serges, the longest wool is chosen for the warp, and the shortest for the woof. But before either kind is used, it is first scoured, by putting it in a copper of liquor, somewhat more than lukewarm, composed of three parts of fair water and one of urine. After it has staid in it long enough for the liquor to take off the grease, &c. it it is stirred briskly about with a wooden peel, taken out, drained, washed in a running water, and dried in the shade; beaten with sticks on a wooden rack, to drive out the coarser dust and filth; and then picked clean with the hands. It is then greased with oil of olives, and the longest wool combed with large combs, heated in a little furnace for that purpose: to clear it from the oil, it is put into a vessel of hot soap-water, whence being taken out, wrung, and dried, it is spun on the wheel. As to the shorter wool, intended for the woof, it is only carded on the knee with small fine cards, and then spun on the wheel, without being scoured of its oil: and here it is to be observed, that the thread for the warp is always to be spun finer, and much better twisted, than that of the woof.

The wool both for the warp and woof being spun, and the thread reeled into skains; that of the woof is put on spools, fit for the cavity of the shuttle; and that for the warp is wound on a kind of wooden bobbins, to fit it for warping; and when warped, it is stiffened with a size, usually made of the shreds of parchment; and, when dried, put into the loom, and mounted so as to be raised by four treddles, placed under the loom, which the workman makes to act transversely, equally, and alternately, one after another, with his feet; and as the threads are raised, throws the shuttle. See the article WEAVING.

The serge, on being taken from the loom, is carried to the fuller, who fulls or scours it, in the trough of his mill, with fullers-earth: and after the first fulling, the knots, ends, straws, &c. sticking out on either side of the surface, are taken off with a kind of plyers or iron-pincers, after which it is returned into the fulling-trough, where it is worked with warm water, in which soap has been dissolved; when quite cleared, it is taken out, the knots are again pulled off; it is then put on the tenter to dry, taking care, as fast as it dries, to stretch it out both in length and breadth, till it be brought to its just dimensions; then being taken off the tenter, it is dyed, shorn, and pressed.

SERGEANT, or SERJEANT *at law*, or *of the coif*, is the highest degree taken at the common law, as that of doctor is of the civil law; and as these are supposed to be most learned and experienced in the practice of the courts, there is one court appointed for them to plead in by themselves, which is the common-pleas, where the common law of England is most strictly observed: but they are not restrained from pleading in any other court, where the judges, who cannot have that honour till they have taken the degree of sergeant at law, call them brothers.

These serjeants are created by the king's writ, commanding them to take upon them that degree therein assigned, under a great penalty: and one or more of these

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is ftiled the king's fergeant, who is chofen out of the reft to plead for him in all caufes, more efpecially thofe of treafon, &c.

SERGEANT *at arms*, or *mace*, an officer appointed to attend the perfon of the king, to arreft traitors, and fuch perfons of quality as offend; and to attend the lord high fteward when fitting in judgment on a traitor.

The number of thefe officers is by ftatute limited to that of thirty: there are now eight at court, who are created with great ceremony; for the perfon kneeling before the king, his majefty lays the mace on his right fhoulder, and fays, "rife up, fergeant of arms, and efquire, for ever." They attend in the prefence-chamber where the band of gentlemen-penfioners wait; and receiving the king at the door, they carry the maces before him, when he goes to chapel, or the houfe of lords. There are four other fergeants at arms created in the fame manner; one of whom attends the lord chancellor; a fecond, the lord treafurer; a third, the fpeaker of the houfe of commons; and a fourth, the lord-mayor of London, on folemn occafions. There is alfo an inferior kind of fergeants at mace, who attend the mayor, or other head officer of corporations.

SERGEANT, or SERJEANT, in war, is an inferior officer in a company of foot, or troop of dragoons, armed with an halbard, and appointed to fee difcipline obferved, to teach the foldiers the exercife of their arms, and to order, ftraiten, and form ranks, files, &c.

SERGEANTY, or SERJEANTY, in law, is taken for a fervice that cannot be due from a tenant to any other lord befides the king.

This is divided into grand and petit fergeanty. Grand fergeanty is where a perfon holds lands of the king, by fuch fervice as he ought to perform in perfon, as to affift at his coronation, bear his banner or fpear, &c. Petit fergeanty is when a man holds lands of the king, on account of his paying him annually fome fmall thing towards his wars, as a fword, dagger, &c.

The honorary fervices of grand ferjeanty ftill continue, notwithftanding the ftatute 12 Car. II. c. 24.

SERICUM, SILK, in natural hiftory. See the article SILK.

Sericum is alfo a name given to the flowers of zink, on account of their fibrofe texture. See the article ZINK.

SERIES, in general, denotes a continued fucceffion of things in the fame order, and having the fame relation or connection with each other: in this fenfe we fay, a feries of emperors, kings, bifhops, &c.

In natural hiftory, a feries is ufed for an order or fubdivifion of fome clafs of natural bodies; comprehending all fuch as are diftinguifhed from the other bodies of that clafs, by certain characters, which they poffefs in common, and which the reft of the bodies of that clafs have not. See CLASS, ORDER, GENUS, &c.

SERIES, in mathematics, is a number of terms, whether of numbers or quantities, increafing or decreafing in a given proportion; the doctrine of which has already been given under the article PROGRESSION.

*Infinite* SERIES, is a feries confifting of an infinite number of terms, that is, to the end of which it is impoffible ever to come; fo that let the feries be carried on to any affignable length, or number of terms, it can be carried yet farther, without end or limitation.

A number actually infinite (that is, all whofe units can be actually affigned, and yet is without limits) is a plain contradiction to all our ideas about numbers; for whatever number we can conceive, or have any proper idea of, is always determinate and finite; fo that a greater after it may be affigned, and a greater after this; and fo on, without a poffibility of ever coming to an end of the addition or encreafe of numbers, affignable; which inexhauftibility, or endlefs progreffion in the nature of numbers, is all we can diftinctly underftand by the infinity of number; and therefore to fay that the number of any things is infinite, is not faying, that we comprehend their number, but indeed the contrary; the only thing pofitive in this propofition being this; that the number of thefe things is greater than any number which we can actually conceive and affign. But then, whether in things that do really exift, it can be truly faid, that their number is greater than any affignable number; or, which is the fame thing, that in the numeration of their units one after another, it is impoffible ever come to an end; this is a queftion about which there are different opinions,

with which we have no bufinefs in this place; for all that we are concerned here to know, is this certain truth, that after one determinate number, we can conceive a greater, and after this a greater, and fo on without end. And therefore, whether the number of any things that do or can really exift all at once, can be fuch that it exceeds any determinable number, or not, this is true, that of things which exift, or are produced fucceffively one after another, the number may be greater than any affignable one; becaufe though the number of things thus produced, that does actually exift at any time, is finite, yet it may be increafed without end. And this is the diftinct and true notion of the infinity of a feries; that is, of the infinity of the number of its terms, as it is expreffed in the definition.

Hence it is plain, that we cannot apply to an infinite feries the common notion of a fum, *viz.* a collection of feveral particular numbers that are joined and added together one after another, for this fuppofes that thefe particulars are all known and determined; whereas the terms of an infinite feries cannot be all feparately affigned, there being no end in the numeration of its parts, and therefore it can have no fum in fenfe. But again, if we confider that the idea of an infinite feries confifts of two parts, *viz.* the idea of fomething pofitive and determined, in fo far as we conceive the feries to be actually carried on; and the idea of an inexhauftible remainder ftill behind, or an endlefs addition of terms that can be made to it one after another; which is as different from the idea of a finite feries as two things can be: hence we may conceive it as a whole of its own kind, which therefore may be faid to have a total value whether that be determinable or not. Now in fome infinite feries this value is finite or limited; that is, a number is affignable beyond which the fum of no affignable number of terms of the feries can ever reach, nor indeed ever be equal to it, yet it may approach to it in fuch a manner, as to want lefs than any affignable difference; and this we may call the value or fum of the feries; not as being a number found by the common method of addition, but as being fuch a limitation of the value of the feries, taken in all its infinite capacity, that if it were poffible to add them all one after another, the fum would be equal to this number.

Again, in other feries the value has no limitation; and we may exprefs this, by faying, the fum of the feries is infinitely great; which indeed fignifies no more than that it has no determinate and affignable value; and, that the feries may be carried fuch a length as its fum, fo far, fhall be greater than any given number. In fhort, in the firft cafe we affirm there is a fum, yet not a fum taken in the common fenfe; in the other cafe we plainly deny a determinate fum in any fenfe.

Theorem I. In an infinite feries of numbers, increafing by an equal difference or ratio (that is, an arithmetical or geometrical encreafing progreffion) from a given number, a term may be found greater than any affignable number. Hence, if the feries encreafe by differences that continually encreafe, or by ratios that continually encreafe, comparing each term to the preceding, it is manifeft that the fame thing muft be true, as if the differences or ratios continued equal.

Theorem II. In a feries decreafing in infinitum in a given ratio, we can find a term lefs than any affignable fraction. Hence, if the terms decreafe, fo as the ratios of each term to the preceding do alfo continually decreafe, then the fame thing is alfo true, as when they continue equal.

Theor. III. The fum of an infinite feries of numbers all equal, or encreafing continually, by whatever differences or ratios, is infinitely great; that is, fuch a feries has no determinate fum, but grows fo as to exceed any affignable number.

Demonf. 1. If the terms are all equal, as A : A : A, *&c.* then the fum of any finite number of them is the product of A by that number, as A $n$; but the greater $n$ is, the greater is A $n$; and we can take $n$ greater than any affignable number, therefore A $n$ will be ftill greater than any affignable number.

Secondly, fuppofe the feries encreafes continually, (whether it do fo infinitely or limitedly) then its fum muft be infinitely great, becaufe it would be fo if the terms continued all equal, and therefore will be more fo, fince they encreafe. But if we fuppofe the feries encreafes infinitely, either by equal ratios or differences, or by increafing differences or ratios

ratios of each term to the preceding; then the reason of the sums being infinite will appear from the first theorem; for in such a series, a term can be found greater than any assignable number, and much more therefore the sum of that and all the preceding.

Theor. IV. The sum of an infinite series of numbers decreasing in the same ratio is a finite number; equal to the quote arising from the division of the product of the ratio and first term, by the ratio less by unity; that is, the sum of an assignable number of terms of the series can ever be equal to that quote; and yet no number less than it, is equal to the value of the series, or to what we can actually determine in it; so that we can carry the series so far, that the sum shall want of this quote less than any assignable difference.

Demonst. To whatever assigned number of terms the series is carried, it is so far finite; and if the greatest term is $l$, the least A, and the ratio $r$, then the sum is $S = \frac{rl - A}{r - 1}$. See *Geo.* PROGRESSION.

Now, in a decreasing series from $l$, the more terms we actually raise, the last of them, A becomes the lesser, and the lesser A be, $rl - A$ is the greater, and so also is $\frac{rl - A}{r - 1}$: but $rl - A$ being still less than $rl$, therefore $\frac{rl - A}{r - 1}$ is still less than $\frac{rl}{r - 1}$, that is, the sum of any assignable number of terms of the series is still less than the quote mentioned, which is $\frac{rl}{r - 1}$, and this is the first part of the theorem.

Again: The series may be actually continued so far, that $\frac{rl - A}{r - 1}$ shall want of $\frac{rl}{r - 1}$ less than any assignable difference; for, as the series goes on, A becomes less and less in a certain ratio, and so the series may be actually continued till A becomes less than any assignable number, (by Theorem. II.) now $\frac{rl}{r - 1} - \frac{rl - A}{r - 1} = \frac{A}{r - 1}$, and $\frac{A}{r - 1}$ is less than A; therefore let any number assigned be called N, we can carry the series so far till the last term A be less than N; and because $\frac{rl - A}{r - 1}$ wants of $\frac{rl}{r - 1}$, the difference $\frac{A}{r - 1}$, which is less than A, which is also less than N, therefore the second part of the theorem is also true, and $\frac{rl}{r - 1}$ is the true value of the series.

Scholium. The sense in which $\frac{rl}{r - 1}$ is called the sum of the series, has been sufficiently explained; to which, however, we shall add this; that whatever consequences follow from the supposition of $\frac{rl}{r - 1}$ being the true and adequate value of the series taken in all its infinite capacity, as if the whole were actually determined and added together, can never be the occasion of any assignable error in any operation or demonstration where it is used in that sense; because if it is said that it exceeds that adequate value, yet it is demonstrated that this excess must be less than any assignable difference, which is in effect no difference, and so the consequent error will be in effect no error: for if any error can happen from $\frac{rl}{r - 1}$ being greater than it ought to be, to represent the complete value of the infinite series, that error depends upon the excess of $\frac{rl}{r - 1}$ over that complete value; but this excess being unassignable, that consequent error must be so too; because still the less the excess is, the less will the error be that depends upon it. And for this reason we may justly enough look upon $\frac{rl}{r - 1}$ as expressing the adequate value of the infinite series. But we are farther satisfied of the reasonableness of this, by finding in fact, that a finite quantity does actually convert into an infinite series, which happens in the case of infinite decimals. For example, $\frac{2}{3} = .6666$, &c. which is plainly a geometrical series from $\frac{6}{10}$ in the continual ratio of 10 to 1; for it is $\frac{6}{10} + \frac{6}{100} + \frac{6}{1000} + \frac{6}{10000}$, &c. And reversely; if we take this series, and find its sum by the preceding theorem, it comes to the same $\frac{2}{3}$; for $l =$



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$\frac{6}{10}$, $r=10$, therefore $rl=\frac{60}{10}=6$; and $r-1=9$; whence $\frac{rl}{r-1}=\frac{6}{9}=\frac{2}{3}$.

We have added here a table of all the varieties of determined problems of infinite, decreasing, geometrical progressions, which all depend upon these three things, *viz.* the greatest term $l$, the ratio $r$, and the sum S; by any two of which the remaining one may be found: to which we have added some other problems, wherein S — L is considered as a thing distinct by itself, that is, without considering S and L separately.

| Given | Sought | | | Solutions |
|---|---|---|---|---|
| $r\ l$ | $s$, | $s=\frac{rl}{r-1}$ | Or supposing the ratio $\frac{a}{b}$ or the second term to be M, whereby the ratio is $\frac{l}{\text{M}}$, then is | $s=\frac{a}{a-b}$ of $l=\frac{l^2}{l-\text{M}}$ |
| $r\ s$ | $l$, | $l=\frac{s\times\overline{r-1}}{r}$ | | $l=\frac{a-b}{a}$ of $s=\frac{\overline{l-\text{M}}\times s}{l}$ |
| $l\ s$ | $r$, | $r=\frac{}{s-l}$ } | | $s-l=\frac{b}{a-b}$ of $l=\frac{\text{M}l}{l-\text{M}}$ |
| $l\ r$ | $s-l$, | $s-l=\frac{l}{r-1}$ | | |
| $s\ r$ | $s-l$, | $s-l=\frac{s}{r}$ | | $s-l=\frac{b}{a}$ of $s=\frac{\text{M}s}{l}$ |
| $r.\ s-l$ | $s,\ l$ | $\left\{\begin{array}{l} s=\overline{s-l}\times r \\ l=\overline{s-l}\times\overline{r-1} \end{array}\right\}$ | | $s=\frac{a}{b}$ of $s-l=\frac{l\times\overline{s-l}}{\text{M}}$; $l=\frac{a-b}{b}$ of $s-l=\frac{\overline{l-\text{M}}\times\overline{s-l}}{\text{M}}$ |

Theorem V. In the arithmetic progression 1, 2, 3, 4, &c. the sum is to the product of the last term, by the number of terms, that is, to the square of the last term; in a ratio always greater than 1:2, but approaching infinitely near it. But if the arithmetical series begins with 0, thus, 0, 1, 2, 3, 4, &c. then the sum is to the product of the last term, by the number of terms, exactly in every step as 1 to 2.

Theorem VI. Take the natural progression beginning with 0, thus, 0, 1, 2, 3, &c. and take the squares of any the like powers of the former series; as the squares, 0, 1, 4, 9, &c. or cubes, 0, 1, 8, 27; and then again take the sum of the series of powers to any number of terms, and also multiply the last of the terms summed by the number of terms, (reckoning always 0 for the first term;) the ratio of that sum, to that product is more than $\frac{1}{n\times 1}$ ($n$ being the index of the powers) that is, in the series of squares it is more than $\frac{1}{3}$; in the cubes more than $\frac{1}{4}$; and so on: but the series going on in infinitum, we may take in more and more terms without end into the sum; and the more we take, the ratio of the sum to the product mentioned grows less and less; yet so as it never can actually be equal to $\frac{1}{n\times 1}$ but approaches infinitely near to it, or within less than any assignable difference.

SERIPHIUM, in botany, a genus of the syngenesia-polygamia-necessaria class of plants; the calyx is a double perianthium, each of which consists of five leaves: the exterior leaves are roundish and imbricated; the interior ones are erect, acuminated, oval-shaped, membranaceous, and very smooth: the corolla is a single funnel-shaped leaf, shorter than the inner cup: there is no pericarpium; the seed, which is single and oblong, is lodged in the cup.

SEROSITY, in medicine, denotes an overabundance of serum. See the articles Serum and Blood.

SERPA, a town of Portugal, in the province of Alentejo, situated on the eastside of the river Guadiana, in west longitude 8° 20′, north latitude 37° 45′.

SERPENS, in astronomy, a constellation of the northern hemisphere; consisting of seventeen stars, according to Ptolemy; of nineteen, according to Tycho; and of fifty-

fifty-nine, in the britannic Catalolgue.

SERPENT, *ferpens*, in zoology, a general term for all amphibious animals without legs. See the article AMPHIBIOUS.

Mr. Ray defines ferpents to be creatures breathing by means of lungs; having only one ventricle in the heart, having no feet, and having a long body, covered with fcales. To which he adds, that in cold feafons they can bear hunger a long time. The greater part of the ferpent clafs are poifonous, and dangerous in their bite, leaving a mifchievous liquor in the wound made by their tooth, which mixing by this means immediately with the blood, is of fatal confequence; though the whole creature may be eaten with fafety, or even the poifonous liquor, which does this mifchief in the wound, tafted without hurt.

Notwithftanding that ferpents refpire by means of lungs, they do not take in and difcharge their breath by fuch fhort intervals as other animals, but what they have once infpired will ferve them a long time; for as they are of a cold nature, and their naturally neceffary vital warmth very fmall, they do not require fuch an eternally renewed fupply of that pabulum of vital heat, as thofe which have more of it; and as with us they lie half the year torpid, and half dead, their vital warmth at that time, like fire fmothered under afhes, barely exifts, and needs perhaps no more air than what the creature took in at one infpiration, before its laying itfelf down for the feafon, which ferves it till the life-renewing fpring returns.

Serpents, according to Mr. Ray, may be divided into the poifonous and the harmlefs; the firft having long dentes exerti, with poifonous liquors contained at their bottom, which on biting they difcharge into the wound; the others wanting thefe teeth, and this poifon.

They may alfo be divided, in regard to their generation, into the oviparous and viviparous; but this is a lefs firmly founded diftinction than may be fuppofed, fince all ferpents are truly and properly produced of eggs; and the only difference is, that fome depofit their eggs in dung-hills, and the like places, to be hatched by accidental heat; while others retain thofe eggs to be hatched in their own bodies, and fo bring forth living young ones. Of the firft kind is the common fnake, of the latter the viper.

This feries of animals comprehends feveral diftinct genera; as the amphifbæna, anguis, coluber, cenchris, and crotalophorus. See the articles AMPHISBÆNA, ANGUIS, &c.

*Sea*-SERPENT, *ferpens marinus*, in ichthyology, a name given to feveral fpecies of muræna. See the article MURÆNA.

SERPENT'S-TONGUES, a name by which fome call the gloffopetræ. See the article GLOSSOPETRA.

SERPENTARIA, SNAKE-ROOT, in botania and pharmacy, the name of a fpecies of ariftolochia, or birthwort, with auriculated leaves. See BIRTHWORT.

The virginian fnake-root obtained its name, as being accounted a fpecific againft venomous bites: but whatever truth there may be in that, it is undoubtedly an excellent diuretic, diaphoretic, and alexipharmic medicine, and, confequently, good in inflammatory and malignant fevers: it is alfo a powerful antifeptic, and its dofe is from four to ten or fifteen grains, in powder.

SERPENTARIUS, in aftronomy, a conftellation of the northern hemifphere; confifting, according to different authors, of 25, 29, or even 69 ftars.

SERPENTINE, in general, denotes any thing that refembles a ferpent: hence, the worm or pipe of a ftill, twifted in a fpiral manner, is termed a ferpentine worm.

SERPENTINE COLUMN. See COLUMN.

SERPENTINE MARBLE, *ophites*, a fpecies of marble, fo called from its being variegated with ftreaks and fpots like the fkin of a ferpent. See MARBLE.

SERPENTINE VERSES, fuch as begin and end with the fame words.

SERPIGO, in medicine, a fpecies of herpes. See the article HERPES.

SERRATED, in general, fomething indented, or notched, in the manner of a faw; a term much ufed in the defcription of the leaves of plants, which are faid to be duplicately ferrated, when the edges of the large ferratures are again ferrated with leffer indentings of the fame kind.

SERRATULA, SAW-WORT, in botany, a genus of the fyngenefia-polygamia-æqualis clafs of plants, the compound flower of which is tubulofe and uniform; and the partial ones are monopetalous, infundibuliform, and quinquifid at the limb: the ftamina are five very fhort capillary filaments: the feeds are folitary, crowned with down, and contained in the cup.

SERPA,

SERPA, a town of Portugal, in the province of Alentejo, weft long. 8° 20′, north lat. 37° 45′.

SERRATUS, in anatomy, a name given to feveral mufcles from their refemblance to a faw: as, 1. The ferratus major anticus, which arifes by dentated origins from the fix lower true ribs, and from one, or fometimes two, of the upper fpurious ones. 2. The ferratus minor anticus, called alfo the pectoralis minor, which arifes from the fecond, third, and fourth true ribs, continues its courfe under the pectoralis magnus, and is inferted into the caracoide procefs of the fcapula: thefe two ferves to move the fcapula forward and downward, and many anatomical writers have referred them to the number of the elevators of the ribs. 3. The ferratus pofticus fuperior, which arifes with a thin and broad tendon, from the two lower vertebræ of the neck, and the two upper ones of the back; and terminates in the fecond, third, and fourth ribs. 4. The ferratus pofticus inferior, which arifes with a broad tendon from the three lower vertebræ of the back, and the two upper ones of the loins; it terminates in the four inferior fpurious ribs, and furrounds the extenfors of the back, in the manner of a vagina, to prevent their fibres from feparating one from another, as they might otherwife do in violent motions: thefe two laft contribute to refpiration.

SERTULARIA, in botany, a genus of the cryptogamia-lithophytorum of Linnæus, and the fame with the coralline of Tournefort. See CORALLINE.

SERVANT, a term of relation fignifying a perfon who owes and pays a limited obedience for a certain time, to another in quality of mafter.

If any fervant, who is hired for a year, depart before the end of his term, without reafonable caufe, to be allowed by a juftice of the peace; or after the term is expired, without giving a quarter's warning, he is liable to be committed to prifon by two juftices, till he gives fecurity to ferve out the time; or he may by one juftice be fent to the houfe of correction, there to be punifhed as a diforderly perfon, 7 Jac. I. c. 4. On the other hand, a mafter cannot put away his fervant before the end of the term he was hired for, without fome reafonable caufe allowed by a juftice of the peace; nor after the expiration of the term without a quarter's warning given, on pain of forfeiting 40 s. Where a fervant that is hired for a year happens to fall fick, fuch fervant ought not to be difcharged, nor his wages abated on that account.

It is held, that if one being a creditor fends his fervant for money, to whom it is paid, this will be a good payment and difcharge, though the fervant does not bring the money to his mafter. It has been adjudged, that where a fervant ufually buys goods for his mafter upon credit, and takes up things in his name, though it be for his own ufe, the mafter is liable: neverthelefs it is not fo where the mafter ufually gives him ready money. Where the mafter gives his fervant money to buy goods for him, and he converts the money to his own particular ufe, and at the fame time buys them upon credit, the mafter is anfwerable where fuch goods came into his own poffeffion.

SERVETISTS, a name given to the modern antitrinitarians, from their being fuppofed to be the followers of Michael Servetus, who, in the year 1599, was burnt at Geneva, together with his books.

SERVIA, a province of european Turky, bounded by the Save and the Danube, on the north; by Bulgaria, on the eaft; by Albania and Macedon, on the fouth; and by Bofnia and Dalmatia, on the weft.

SERVICE, in law, is a duty which a tenant, on account of his fee, owes to his lord.

There are many divifions of fervices, as, 1. Into perfonal, where fomething is to be done by the tenant in perfon, as homage and fealty. 2. Real, fuch as wards, marriages, &c. 3. Accidental, including heriots, reliefs, and the like. 4. Intire, where, on the alienation of any part of the lands by a tenant, the fervices become multiplied. 5. Frank-fervice, which was performed by freemen, who were not obliged to perform any bafe fervice, but only to find a man and horfe to attend the lord into the army, or to court. 6. Knight's fervice, by which lands were antiently held of the king, on paying homage, fervice in war, &c. 7. The rights and prerogatives, which within certain manors belong to the lords thereof by the king's grants, fuch as the power of judicature in matters of property, and in felonies and murders; minting of money, affize of bread, beer, weights and meafures, affeffments, &c.

SERVITES,

SERVITES, a religious order in the church of Rome, founded about the year 1233, by feven florentine merchants, who with the approbation of the bifhop of Florence renounced the world, and lived together in a religious community on mount Senar, two leagues from that city. It is pretended, that when they firft appeared in the black habit given them by the bifhop, the very children at the breaft cried out, *fee the fervants of the Virgin,* and that this miracle determined them to take no other name but fervites, or fervants of the Virgin. This order became very numerous.

There are alfo nuns of this order, who have feveral monafteries in Germany, Italy, and Flanders.

SERVITOR, in the univerfity of Oxford, a ftudent who attends on another for his maintenance and learning.

SERVITORS *of bills*, fervants or meffengers of the marfhal of the king's bench, fent with bills or writs, to fummon people to that court: thefe are now called tipftaves.

SERVITUDE, the condition of a fervant, or rather flave. See the articles SERVANT and SLAVE.

SERUM, a thin, tranfparent, faltifh liquor, which makes a confiderable part in the mafs of blood. See *Analyfis of the* BLOOD.

The ferum is in reality the fame with the lympha, which is carried by the arteries through the feveral parts of the body; whence it returns partly in the veins, and partly in the lymphatic veffels. See the article LYMPH.

Sweat and urine are nothing but ferum drained of their nutritious parts, by repeated circulations, and fecreted from the blood in the glands of the fkin and kidneys.

SESAMOIDA OSSA, in anatomy, feveral fmall bones that fomewhat refemble the feed of the fefamum, whence their name. Their moft ufual fituation is, 1. In the thumb or great toe; in each of which we often find two of them, though not unfrequently only one. 2. One in the juncture of the metacarpus with the little finger: this is frequently lodged in the mufcle of that finger. 3. One frequently in each external condyle of the os femoris. One under the os cuboides of the tarfus, in the tendon of the peronæus poftius. Thefe are ufually found in adults, or in elderly people. Sometimes, though more rarely, there is alfo one in the internal condyle of the os femoris; and fometimes there is one in the external furface of the os metacarpi, which fuftains the fore-finger, lodged in the tendon of the adductor mufcle of the index. Upon the whole, fays Heifter, there are very rarely found more than fixteen of them; thofe anatomifts, therefore, err greatly, who place two at the articulation of each finger and toe.

The fize and fhape of thefe bones are various and irregular: they are cartilaginous in young fubjects, but grow hard and bony by age. They ferve as a kind of trochleæ to the mufcles, and increafe their power.

SESAMUM, the OILY GRAIN PLANT, in botany, a genus of the didynamia-angiofpermia clafs of plants, the corolla whereof confifts of a ringent petal; the tube is roundifh, and almoft the length of the cup; the faux is inflated, patent, and very large; the limb is quenquifid; the fruit confifts of an oblong quadragonal capfule, compreffed, acuminated and quadrilocular: the feeds are numerous and roundifh.

The feeds of this plant, upon expreffion, yield a larger quantity of oil than almoft any other known vegetable; among the Indians they are ufed as food.

SESELI, DUTCH SAXIFRAGE, in botany, a genus of the pentandria-digynia clafs of plants, the general corolla of which is uniform; the fingle flowers are compofed each of five inflexo-cordate and flightly unequal petals; the fruit is naked, oval, fmall, ftriated, and feparable into two parts; the feeds are two, oval, convex, and ftriated on one fide, and plane on the other.

SESQUI, a latin particle, fignifying a whole and a half, which joined with *altera, terza, quarta,* &c. is much ufed in the italian mufic to exprefs a kind of ratios, particularly feveral fpecies of triples. See the article TRIPLE.

The ratio expreffed by fefqui is the fecond ratio of inequality, called alfo fuper-particular ratio, and is when the greater term contains the lefs once, and fome certain part over, as 3 : 2, where the firft term contains the fecond once, and unity over, which is a quota part of 2. Now if the part remaining be juft half the lefs term, the ratio is called fefqui-altera; if it be a third part of the lefs term, as 4 : 3, the ratio is called fefqui-terza, or tertia; if a fourth, as 5 : 4, the

the ratio is ſeſqui-quarta, and thus to infinity, ſtill adding to ſeſqui the ordinal number of the leſs term. In Engliſh we ſometimes ſay, ſeſqui-alteral, ſeſqui-third, fourth, *&c.* As to the kinds of triples expreſſed by the particle ſeſqui, they are theſe, the greater perfect ſeſqui-alteral, *ſeſqui-altera magiore, perfetta*, which is a triple where the breve is three minims, and that without having any point or dot annexed to it. The greater imperfect ſeſqui-alteral, which is where the breve when pointed contains three minims, and that without any point, only two. The leſs perfect ſeſqui-alteral, is where the ſemi-breve contains three minims, and that without any point. The leſs imperfect ſeſqui-alteral is a triple where the ſemi-breve with a point contains three minims, and two without. According to Buontempi, one may likewiſe call the triples $\frac{6}{4}$ and $\frac{12}{8}$ ſeſqui-alterals. See the article PROPORTION.

Seſqui-octave is a kind of triple marked C $\frac{9}{8}$, called by the Italians *nonupla di crome*, where there are nine quavers in every bar, whereof eight are required in common time. The double ſeſqui-fourth, or ſequi-quarta dupla, marked thus, C $\frac{9}{4}$, called by the Italians *nonupla di ſemiminime*, is where there are nine crotchets in a bar inſtead of four, in common time. Seſqui-terza, the triples $\frac{4}{3}$, and $\frac{12}{16}$, ſays Buontempi, may be thus denominated. Seſqui-ditone is a concord reſulting from the ſound of two ſtrings whoſe vibrations in equal time are to each other as 5 : 6. See the article DITONE, VIBRATION, CHARACTER, *&c.*

SESQUI-ALTERAL PROPORTION, in geometry and arithmetic, is when any number or quantity contains another once and an half, and the number ſo contained in the greater, is ſaid to be to it in ſubſequi-alteral proportion. See the article PROPORTION.

SESQUI-DUPLICATE PROPORTION, is when of two terms the greater contains the leſs twice, with half another over.

SESQUI-QUADRATE, an aſpect or poſition of the planets, when they are at the diſtance of four ſigns and an half, or 135 degrees from each other; and ſeſquiquintile is an aſpect of the planets when they are 108 degrees from each other.

SESQUI-TERTIONAL PROPORTION, is when any number or quantity contains another once and one third.

SESSA, a town of Italy, in the kingdom of Naples, and territory of Lavoro, ſituated a little weſt of the Tuſcan ſea, twenty-four miles north of Naples.

SESSILE ROOTS, among botaniſts, ſuch tuberous roots as adhere to the baſe of the ſtalk. And a ſeſſile leaf expreſſes a leaf immediately fixed to the ſtalk or root without any petiole.

SESSION, *ſeſſio*, in general, denotes each ſitting or aſſembly of a council, *&c.*

SESSION *of parliament*, is the ſeaſon or ſpace from its meeting to its prorogation. See the article PARLIAMENT.

*Kirk*-SESSIONS. See KIRK-SESSIONS.

SESSION *for weights and meaſures*, is in London taken for a ſitting of four juſtices choſen from among the mayor, recorder, and aldermen, who hold a court in order to inquire into offences of perſons ſelling by falſe weights and meaſures contrary to the ſtatutes, and to puniſh the ſame.

SESSION, in law, denotes a ſitting of juſtices in court upon their commiſſion; as the ſeſſions of oyer and terminer, the quarter ſeſſions, otherwiſe called the general or open ſeſſions of the peace, in oppoſition to what is called a privy ſeſſion, held upon ſpecial occaſions for ſpeedier diſpatch of juſtice. This general ſeſſion of the peace is a court of record held before two or more juſtices, one being of the quorum, for the execution of the authority granted them by their commiſſion and particular ſtatutes, whereby they are authorized to hear and determine treſpaſſes againſt the public peace, *&c.* and likewiſe divers offences by ſtatute. This court of ſeſſions is held four times a year in every county. See the article COURT, *&c.*

SESTERCE, *ſeſtertius*, a ſilver coin in uſe among the Romans. See COIN.

Some authors make two kinds of ſeſterces, the leſs, called ſeſtertius, in the maſculine gender, and the great one, called ſeſtertium, in the neuter, the latter containing a thouſand of the other. See the article MONEY.

Others will have any ſuch diſtinction of great and little ſeſterces unknown to the Romans; ſeſtertius, ſay they, was an adjective, and ſignified *as ſeſtertius*, or two aſſes and an half, and when uſed plurally, as in quinquaginta ſeſtertium, or ſeſtertia, it was only by way of abbreviation, and there was always underſtood millia, or thouſands.

Seſterce, or ſeſtertius, was alſo uſed by the

the antients for a thing containing two wholes and an half of another, as *as* was taken for any whole or integer. See the article As.

SESTOS, a noted fortrefs of european Turky, fituated at the entrance of the Hellefpont or Dardanells, twenty-four miles fouth-weft of Gallipoli.

SESTUPLO, in mufic. See SEXTUPLE.

SET, or SETS, a term ufed by the farmers and gardiners to exprefs the young plants of the white thorn and other fhrubs, with which they ufe to raife their quick or quickfet hedges. See the articles HEDGE and OFF-SETS.

SET-BOLTS, in a fhip. See BOLT.

SETHIANS, in church-hiftory, chriftian heretics, fo called becaufe they paid divine worfhip to Seth, whom they looked upon to be Jefus Chrift the fon of God, but who was made by a third divinity, and fubftituted in the room of the two families of Abel and Cain, which had been deftroyed by the deluge. Thefe heretics appeared in Egypt in the fecond century, and as they were addicted to all forts of debauchery, they did not want for followers, and continued in Egypt above two hundred years.

SETIMO, a town of Italy in the province of Piedmont, fituated on the river Po, eight miles north of Turin.

SETON, in furgery, a few horfe-hairs, fmall threads, or large packthread drawn through the fkin, chiefly the neck, by means of a large needle or probe, with a view to reftore or preferve health.

There are chiefly three methods of performing this operation practifed among furgeons. The firft is by taking up the fkin in the lower part of the neck, and introducing a needle armed with filk or thread through the fkin, which is to be left in the neck after the needle is removed; the wound is then dreffed with fome digeftive ointment, and covered with a plafter perforated on each fide for the ligature to pafs through; the ligature is to be fhifted or drawn through the wound a little every day, and the matter is to be wiped off, by which means it will degenerate into an ulcer with a double orifice, making a copious difcharge daily; and when one ligature is become foul and unfit for ufe, another may be introduced by faftening it to the end of the old one. The fecond way of making a feton differs little from the former; only inftead of a large needle, a double-edged fcalpel is made ufe of, by means of which a larger aperture is made, and a greater quantity of matter is thereby difcharged. The third manner is by an inftrument for the purpofe, whereby the fkin is pinched up, and afterwards perforated with a fharp-pointed and red-hot iron, after which the ligature is introduced. We find by experience, that fetons are very ufeful in the hydrocephalus, catarrhs, inflammations and other diforders, particularly thofe of the eyes, as a gutta ferena, cataract, and incipient fuffufion; to thofe we may add intenfe headachs, with ftupidity, drowfinefs, epilepfies, and even an apoplexy itfelf.

SETTE, in geography, the fame with Cette. See the article CETTE.

SETTE, a veffel very common in the Mediterranean, with one deck, and a very long and fharp prow; they carry fome two mafts, fome three, without topmafts. Their yards and fails are all like the mifen; the leaft of them are of fixty tons burden: they ferve to tranfport cannon and provifion for fhips of war, and the like.

SETTER, among farmers. To fetter is to cut the dewlap of an ox or cow, and into the wound to put the root of the helleborafter, whereby an iffue is made for ill humours to vent themfelves.

SETTING, in aftronomy, the withdrawing of a ftar or planet, or its finking below the horizon. Aftronomers and poets make three different kinds of fetting of the ftars, *viz.* the cofmical, acronychal, and helical. See the articles COSMICAL, ACRONYCHAL, HELICAL, and RISING.

SETTING, in the fea language. To fet the land or the fun, by the compafs, is to obferve how the land bears on any point of the compafs, or on what point of the compafs the fun is. Alfo when two fhips fail in fight of one another, to mark on what point the chafed bears, is termed fetting the chafe by the compafs.

SETTING, among fportfmen, a term ufed to exprefs the manner of taking partridges by means of a dog peculiarly trained to that purpofe.

The fetting-dog generally ufed is a long land-fpaniel, taught by nature to hunt partridges more than any other game, and in his untaught ftate running over the fields in fearch of them; but being taught, the creature is under fuch excellent command, that he will, in the midft of his higheft career, attend the leaft hem from his mafter, and ftands ftill to look in his face and to take his or-

ders by the flighteft fignals; and when he is fo near his game that it is almoft in his mouth, he will ftand ftock-ftill, or lye down on his belly, till his mafter arrives, and he receives his directions. The fetting-dog being taken to the haunt of the partridges, is to be caft off, and fent to range; but he muft be made to keep near the fportfman, and not to run wildly on, but to beat all the ground regularly. If in the dog's ranging he ftops on a fudden, the fportfman is to make up to him, and as there is certainly game before him, he muft be ordered to advance; if he refufes this and looks back and fhakes his tail, it is a fignal that they are clofe before him, and the fportfman is then to take a circumference, and look carefully before the dog's nofe, to fee where they are, and how they lie; then going up and ftaking down one end of the net, he is to command the dog to lie ftill, and to draw the net gently over the birds, then making in with a noife, he is to fpring them, and they will be entangled and taken, as they rife.

SETTLE, a market-town in the weft riding of Yorkfhire, fituated forty-five miles weft of York.

SEVENOAK, a market-town of Kent, fourteen miles weft of Maidftone.

SEVENTH, *feptima*, in mufic, an interval called by the Greeks heptachordon, whereof there are four kinds; firft, the defective feventh, confifting of three tones and three greater femitones; the fecond, called by Zarlin and the Italians demiditono con diapente, or fettimo minore, is compofed diatonically of feven degrees and fix intervals, four whereof are tones, and the reft greater femi-tones, and chromatically of ten femi-tones, fix whereof are greater, and four lefs; it takes its form from the ratio quadriparziente quinto, as 9 : 5. The third, called by the Italians il ditono con diapente, or fettimo maggiore, is compofed diatonically of feven degrees, like the former, and fix intervals, five whereof are tones and a major femi-tone, fo that only a major femi-tone is wanting to make up the octave, and chromatically of twelve femi-tones, fix greater and fix lefs. It takes its form from the ratio of 15 : 8. The fourth is redundant, and compofed of five tones, a greater femi-tone and a lefs, fo that it wants only a comma of an octave, that is, fo much as to make its fecond femitone greater, called pentatonon. Hence many confound it with the octave, maintaining with good reafon, that only the three firft fevenths can be of any ufe.

SEVER, a town of France, in the province of Gafcony, fituated on the river Adour, thirty-eight miles north-eaft of Bayonne.

SEVERAL, a term much ufed in law: thus feveral action, fignifies an action wherein two or more are feverally charged. See the article ACTION.

Several covenant, that entered into by two or more perfons feverally. Any fuch covenant, though contained in one deed or writing, is deemed as feveral deeds wrote on the fame piece of paper or parchment. See COVENANT.

Several inheritance, is when an inheritance is conveyed fo as to defcend to two perfons feverally by moieties, &c. See the article INHERITANCE.

Several tail, fignifies that eftate or land which is intailed feverally on two; as where lands are given to two men and their wives, and to the heirs of their bodies to be lawfully begotten, in which cafe the donees hold jointly for their two lives, and at the fame time have a feveral or feparate inheritance: for the iffue of the one fhall have his moiety in tail, and the iffue of the other his. See TAIL.

Several tenancy, is a plea or exception to a writ which is taken out againft two perfons as joint-tenants, who in fact are feveral.

SEVERANCE, in law, the fingling or feparating of two or more joined in one writ. According to Hale there are two kinds of feverances, one where a plaintiff will not appear, and the other where feveral plaintiffs appear, but fome of them will not proceed in the fuit. Severance is allowed as well in real as in perfonal actions. There is a feverance of the tenants in affife, which is where one or two diffeifes appear upon the writ, and not the other. There is alfo feverance in debt, as where two or more executors are plaintiffs in a fuit, and one of them refufes to profecute. Likewife if in a writ of error there are feveral plaintiffs, and the one only affigns errors, or in cafe the other releafe the fame, this will not be good without fummoning and fevering the reft. Where there is a feverance of joint tenants, in fuch cafe the profecution of the fuit is fevered, but not the eftate in the lands, &c. And upon fuing out a writ of fummons and feverance, if the party does not come in thereon, the

other

other ſhall have judgment *ad proſequendum ſolum*, to proſecute alone, which may be done in the court of king's bench by giving a rule, &c.

SEVERANCE *of corn*, ſignifies the cutting and carrying the ſame off the ground; and ſometimes it is taken for the ſetting out the tithe from the reſt of the corn.

SEVERINO ST. a city of Naples, in the province of Calabria, ſituated eaſt long. 17° 30′, north lat. 39° 16′. This is alſo the name of a town in the pope's territories and marquiſate of Ancona, ſituated twenty miles ſouth-eaſt of Loretto.

SEVERN, a river of South-Britain, which riſing in Montgomeryſhire, runs eaſt till it enters Shropſhire; and having paſſed by Shrewſbury turns ſouth, and diſcharges itſelf into the Briſtol-channel.

SEVIERO, a town of Italy, in the kingdom of Naples, and territory of Capitinat: ſituated in eaſt long. 16° 12′, north lat. 41° 32′.

SEVILLE, a city of Spain, capital of the province of Andaluſia, ſituated on the river Guadalquivir, in weſt long. 6°, north lat. 37° 15′.

SEVOLD, or SEGEWOLD, a town of Livonia, ſituated thirty miles north-eaſt of Riga.

SEVUM, or SEBUM, SUET, in anatomy, See the article SUET.

SEWER, in the houſhold, an officer who comes in before the meat of a king or nobleman, to place and range it on the table.

SEWER is alſo a paſſage or gutter made to carry water into the ſea or a river, whereby to preſerve the land, &c. from inundations and other annoyances. The buſineſs of the commiſſioners of ſewers, or their office in particular, is to repair ſea-banks and walls, ſurvey rivers, public ſtreams, ditches, &c. and to make orders for that purpoſe. See the article COMMISSION.

Theſe commiſſioners have likewiſe authority to make enquiry of all nuſances or offences committed by the ſtopping of rivers, erecting mills, not repairing banks, bridges, &c. and to tax perſons chargeable for the amending of defaults that tend to the obſtruction or hindrance of the free paſſage of the water through its antient courſes. They may not only make a rate and aſſeſſment for repairs, but alſo may decree lands to be ſold, in order to levy charges aſſeſſed, upon non-payment thereof, &c. But the decrees of the commiſſioners are to be certified into chancery, and have the king's aſſent to be binding, and their proceedings are ſubject to the juriſdiction of the king's-bench. In the making of a rate or tax, the commiſſioners are to aſſeſs every owner or poſſeſſor of lands in danger of receiving any damage by the waters, equally according to the quality of their lands, rents, and numbers of acres, and their reſpective portions and profits, whether it be of paſture, fiſhing, &c. And where no perſons or lands can be known that are liable to make repairs of banks and ſewers, then the commiſſioners are to rate the whole level. The 3. Jac. I. ordains that all ditches, banks, bridges, and water-houſes, within two miles of London, adjoining to, and falling into the Thames, ſhall be ſubject to the commiſſioners of ſewers. Alſo the lord mayor, &c. may appoint perſons in that caſe to have the power of commiſſioners of ſewers. Perſons breaking down ſea-banks, whereby lands are damaged, are adjudged to be guilty of felony; and removing piles, &c. forfeit twenty pounds, by 6 and 10 Geo. II. c. 32.

SEX, *ſexus*, ſomething in the body which diſtinguiſhes male from female.

SEXAGENARY, ſomething relating to the number ſixty: thus ſexagenary or ſexageſimal arithmetic, is a method of computation proceeding by ſixties; ſuch is that uſed in the diviſion of a degree into ſixty minutes, of the minute into ſixty ſeconds, of the ſecond into ſixty thirds, &c. Alſo ſexagenary tables are tables of proportional parts, ſhewing the product of two ſexagenaries that are to be multiplied, or the quotient of the two that are to be divided.

SEXAGESIMA, the ſecond ſunday before Lent, or the next to Shrove-Sunday, ſo called as being about the ſixtieth day before Eaſter.

SEXAGESIMALS, or SEXAGESIMAL-FRACTIONS, fractions whoſe denominators proceed in a ſexagecuple ratio; that is, a prime, or the firſt minute $=\frac{1}{60}$; a ſecond $=\frac{1}{3600}$; a third $=\frac{1}{216000}$. Antiently there were no other than ſexageſimals uſed in aſtronomy, and they are ſtill retained in many caſes, though decimal arithmetic begins to grow in uſe now in aſtronomical calculations. In theſe fractions, which ſome call aſtronomical fractions, the denominator being always ſixty, or a multiple thereof, is uſually omitted, and the numerator only written down, thus, 4°, 59′, 32″, 50‴, 16⁗,

 is

is to be read four degrees, fifty-nine minutes, thirty-two seconds, fifty thirds, sixteen fourths, &c.

SEXANGLE, in geometry, a figure having six sides, and consequently six angles.

SEXTANS, *sextant*, a sixth part of certain things. The Romans having divided their *as* into twelve ounces, or *unica*, the sixth part of that, or two ounces, was the sextans.

Sextans was also a measure which contained two ounces of liquor, or two cyathi. See the article MEASURE.

SEXTANT, in mathematics, denotes the sixth part of a circle, or an arch comprehending sixty degrees. See CIRCLE.

The word sextant is more particularly used for an astronomical instrument made like a quadrant, excepting that its limb only comprehends sixty degrees. The use and application of the sextant is the same with that of the quadrant. See the article QUADRANT.

SEXTARIUS, an antient roman measure. See the article MEASURE.

SEXTERY LANDS, signifies lands formerly given to a church, or religious house, for the maintenance of a sexton. See the article SEXTON.

SEXTILE, *sextilis*, the position or aspect of two planets when at sixty degrees distance, or at the distance of two signs from one another. It is marked thus (✱). See the article ASPECT.

SEXTON, a church-officer, whose business is to take care of the vessels, vestments, &c. belonging to the church, and to attend the minister, church-wardens, &c. at church. He is usually chosen by the parson only. The office of sexton, in the pope's chapel, is appropriated to the order of the hermits of St. Augustine. He is generally a bishop, though sometimes the pope only gives a bishopric in particular to him on whom he confers the post: he takes the title of prefect of the pope's sacristy, and has the keeping of the vessels of gold and silver, the relics, &c. When the pope says mass the sexton always tastes the bread and wine first. If it be in private he says mass, his holiness of two wafers gives him one to eat; and if in public, the cardinal who assists the pope in quality of deacon, of three wafers gives him one to eat. When the pope is very sick he administers to him the sacrament of extreme unction, &c. and enters the conclave in quality of first conclavist.

SEXTUPLE, *sestuplo*, in music, denotes a mixed sort of triple which is beaten in double time. See the article TRIPLE.

Authors usually make mention of three species hereof, to which Mr. Brossard adds two others, five in all, which are these: sextuple of a semi-breve, called by the French triple of 6 for 1, as being denoted by the numbers $\frac{6}{1}$; or because here are required six semi-breves to a measure instead of one, in common time, three for the rising and three for the falling of the hand. Sextuple of a minim, called by the French 6 for 2, as being denoted by $\frac{6}{2}$, which shews that six minims must be contained in a bar, whereof two are sufficient in common time. Sextuple of a crotchet, called by the French triple of 6 for 4, because denoted by C $\frac{6}{4}$, wherein six crotchets are contained in the bar instead of four. Sextuple of the chroma, denominated 6 for 8 by the French, as being denoted by $\frac{6}{8}$, which shew that six quavers here make a bar, or semi-breve, instead of eight in common time. Sextuple of the semi-chroma, or triple of 6 for 16, so called as being denoted by the figures $\frac{6}{16}$, which shews that six quavers are here required to a measure instead of sixteen. See the article TIME, &c.

SEXUALISTÆ, among botanical writers, those who have established the classes of plants upon the differences of the sexes and parts of fructification in plants, according to the modern method, as Linnæus, &c. See the article BOTANY.

SEYNE, a river of France, which rising near Dijon, in Burgundy, runs north-west through Champain and the isle of France, through Paris, &c. and crossing Normandy falls into the British-channel, between Havre-de-grace and Honfleur.

SGRAFFIT, *sgraffiata*, in painting, denotes scratch-work, a method of painting in black and white only, not in fresco, yet such as will bear the weather. Sgraffit performs both the design and painting all in one. It is chiefly used to embellish the fronts of palaces and other magnificent buildings.

SHACK, in antient customs, a liberty of winter pasturage. In the counties of Norfolk and Suffolk, the lord of the manor has shack; that is a liberty of feeding his sheep at pleasure in his tenants lands, during the six winter months.

SHACKLES, or SHAKLES. See the article SHAKLES.

SHAD, *alausa*, in ichthyology, a species of

of clupea, with the upper jaw bifid at the extremity, and ſpotted with black: it greatly reſembles the common herring, and is, on that account, ſometimes called the mother of herring: all the fins are whitiſh, except that on the back: the tail is very much forked.

SHADOW, *umbra*, in optics, a privation or diminution of light, by the interpoſition of an opake body; or it is a plane where the light is either altogether obſtructed, or greatly weakened, by the interpoſition of ſome opake body between it and the luminary.

A ſhadow of itſelf is inviſible; and therefore, when we ſay we ſee a ſhadow, we partly mean that we ſee bodies placed in the ſhadow, and illuminated by light reflected from collateral bodies; and, partly, that we ſee the confines of the light. See the article LIGHT.

If the opake body that projects the ſhadow be perpendicular to the horizon, and the place it is projected on be horizontal, the ſhadow is called a right ſhadow; and ſuch are the ſhadows of men, trees, buildings, mountains, *&c.* But if the opake body be placed parallel to the horizon, the ſhadow is called a verſed ſhadow; as the arms of a man ſtretched out, *&c.*

*The laws of the projection of* SHADOWS *from opake bodies.* 1. Every opake body projects a ſhadow in the ſame direction with its rays; that is, towards the part oppoſite to the light. Hence, as either the luminary or the body changes place, the ſhadow likewiſe changes. 2. Every opake body projects as many ſhadows as there are luminaries to enlighten it. 3. As the light of the luminary is more intenſe, the ſhadow is the deeper: hence the intenſity of the ſhadow is meaſured by the degrees of light that ſpace is deprived of. 4. If a luminous ſphere be equal to an opake one it illuminates, the ſhadow, which this latter projects, will be a cylinder, and conſequently will be propagated ſtill equal to itſelf, to whatever diſtance the luminary is capable of acting; ſo that if it be cut in any place, the plane of the ſection will be a circle, equal to a great circle of the opake ſphere. 5. If the luminous ſphere be greater than the opake one, the ſhadow will be conical. If, therefore, the ſhadow be cut by a plane, parallel to the baſe, the plane of the ſection will be a circle; and that ſo much the leſs as it is a greater diſtance from the baſe. 6. If the luminous ſphere be leſs than an opake one, the ſhadow will be a truncated cone; and, conſequently, grows ſtill wider and wider; and therefore, if cut by a plane, parallel to the ſection, that plane will be a circle, ſo much the greater as it is further from the baſe.

*Of* SHADOWS *from the ſun.* The ſun being vaſtly larger than the whole globe of the earth, muſt give all its ſhadows pointed, by reaſon it illumines more than half of them.

In conſequence of this demonſtration, we might conclude, that all the ſun's ſhadows muſt be leſs than the bodies that project them, and diminiſhed more and more as they recede further and further. Now this would be true were there any relation between the body illuminated and the body illumining; but as all objects on the earth are ſo ſmall in compariſon of that ſtar, the diminution of their ſhadows is imperceptible to the eye, which ſees them always equal; *i. e.* either broader or narrower than the body that forms them: on this account all the ſhadows cauſed by the ſun are made in parallels.

From the whole it appears, that to find the ſhadow of any body whatever oppoſed to the ſun, a line muſt be drawn from the top of the luminary perpendicular to the place where the foot of the luminary is to be taken: and through this place an occult line is to be drawn through one of the angles of the plan of the object, and another from the ſun to the ſame angle; and the interſection of the two lines will ſhew how far the ſhadow is to go: all the other lines muſt be drawn parallel hereto.

The ſhadows of the ſun are equal in objects of the ſame height, though at a diſtance from each other. See plate CCXLIV. fig. 3. n° 1.

Experience teaches, that ſtiles, or elevations of the ſame height, removed to a diſtance from each other, do yet project equal ſhadows at the ſame time: for they are lengthening and ſhortening, in proportion as the ſun comes nearer, or recedes further off; one or other of which he is continually doing.

For this reaſon, when the ſhadow of an object is to be caſt any way, you muſt determine the place of the ſun, and the point underneath, to draw two occult lines from the ſame, for the extremity of the ſhadow; as here the paliſade A gives the extreme of its ſhadow in B: and if

from this point B, you draw a point of fight C, this line B C will be the fhadow of the pallifade D, as well as that of A, and of all the reft in the fame line to the very point of fight.

In effect, it muft be held for a certain maxim, that fhadows always retain the fame point of fight as the objects. On the footing of this obfervation, that objects of the fame height give equal fhadows: if you would give the fhadow of the palifades, E, F, which are of the fame height as A, D take in your compaffes the diftance A D, and fet it on the foot of the palifade E, by which you will have E G: then from G draw a line to the point of fight C; and thus you are to proceed, let the number of walks be ever fo great.

Though the fun is made to appear in this figure, it muft not be fuppofed that he is fo near the objects; the defign being only to fhew, that the rays proceed from him in this manner, when at fuch a height, though far without the limits of the piece; as *ibid.* n° 2. which yet has the line for the foot of the object A B; and thofe of the rays of the fun C, C, C, becaufe thefe are always required for finding the extremities of the fhadows.

The fhadow of the object O is found by continuing the line A B, and making it rife over the fteps, and againft the wall, till cut by the ray in the point S, by the rays paffing over the corner of the object, and from S drawing a line to the point of fight T.

To find the fhadow of the object P, it muft be remembered that the foot of the light muft always be fuppofed on the plane where the object is placed. Accordingly, the ray C, cutting the little line AB, fhews how far the fhadow of the little object P muft go, to be thence drawn to the point of fight T. The object V cafts its fhadow all along, though in its way it defcends into a ditch.

The fhadow of the wall R is found by the fame rule as the reft; as appears from the lines A B and the ray C.

SHADOWS *by torch light.* The fhadow of an erect pyramid by torch-light falls as it would by the light of the fun; and in both cafes there is but one line, whereon the vertical point of the pyramid will be found.

Upon the planes B C D E (pl. CCXLV. fig. 1.) draw the diagonals E B and D C; through the central point F, raife the perpendicular F A; and from the four points, B, C, D, E, draw lines to the point A, and the pyramid will be erected.

Then, to find its fhadow, draw an indefinite line from its bafis G of the illuminating body, paffing through F; and from the central flame of the torch H draw another line over the vertex of the pyramid in the line G F, till it cut the point I, which point will limit the fhadow of the pyramid.

Laftly, draw a line from C to I, and another from E to I, and the triangle C I E will be the fhadow of the pyramid. To gain the fhadow of an inverted pyramid, draw perpendicular lines from the angular points of its bafe, and form the fubjacent plane, by means thereof, after the manner directed for the fun.

And from all the angles of this plane draw lines to the bafe of the torch G; then from H, the central point of the flame, draw other lines touching all the angles of the bafe of the inverted pyramid, and dividing thofe of the plane, whereby the fhadow will be defined.

Shadows from the fun are caft all the fame way, and have the fame difpofition; it being impoffible that the fun fhould occafion one fhadow towards the eaft, and another towards the weft, at the fame time.

It is true, in different times of the day, it makes this difference; but never in one and the fame hour.

But the torch, candle, and lamp, have always this effect; for in what place foever one of thefe luminaries be found, provided there be a number of objects about them, the fhadows will be caft various ways; fome to the eaft, fome to the weft, fome to the north, and others to the fouth, according to the fituation of the objects around the luminary: the foot of which, here reprefented by A, (*ibid.* fig. 2.) ferves as a common center, from which they all proceed: and the flame, here reprefented by B, fhews where they are to terminate, though at different diftances; as the neareft produce the fhorteft fhadows, and the remoteft the longeft.

SHADOWS *on feveral parallel planes.* The firft plane here is the floor, whereon the chair A (plate CCXLIV. fig. 3. n° 3.) ftands; the fecond plane is the upper part of the table, parallel to the firft, and may be either above or below it. There might

might alſo be more of theſe planes, wherein to find the foot of the illuminating body, in order to come at the ſhadow of the object. Suppoſe the foot of the illuminating body to be C, and the upper flame B; from the points C and B draw lines through the upper and under parts of the object D, which will give the ſhadow E upon the table.

To find the ſhadow of the chair A, which is placed on the ground, determine the foot of the luminary on the table in C on the ground: this is eaſy by the following inſtructions. From the point of diſtance, which is here ſuppoſed to be without the limits of the paper, draw a line through the foot of the table F; then from the angle G upon the table let fall a perpendicular, cutting the line F in the point H, and from H draw a parallel to the baſe H I, which is equal to the upper part of the table, and will direct to the thing required. For drawing a line from the point of ſight K, through the foot of the luminary C, to the extremity of the table L; from the ſame point L, let fall a perpendicular to H I, which will give the point M.

Then from M draw a line to the point of ſight K, in which line M K the foot of the luminary will be found.

To determine the preciſe point, let fall a perpendicular from the point C, which, cutting the line M H, will give the point N for the foot of the luminary.

This point N being thus found, there will be no difficulty in finding the ſhadow of the chair A, the method being the ſame as for the other objects taught before, that is, from the foot of the luminary N draw lines through all the angles of the plane of the chair, and other lines through the upper part of the chair from the luminary B; theſe latter, by interſecting the former, expreſs the bounds of the ſhadow. For the reſt, the figure gives ſufficient directions.

When two luminaries ſhine on the ſame object, two ſhadows muſt be produced; each of the luminaries occaſioning its reſpective ſhadow, and that in proportion to the circumſtances of the luminary.

If ſuch luminaries, when at equal diſtances be equal, the ſhadows themſelves muſt be equal: but if there be any diſproportion, that is, if one of them be a little bigger than the other, or one of them a little nearer the object than the other, the ſhadows will be unequal. Thus the object O, (pl. CCXLV. fig. 3.) being illuminated by two candles, the one near at hand in P, the other farther off in Q, it is evident the ſhadow of the candle P, will be deeper than that of the candle Q, as is expreſſed in the figure.

The rules for ſuch ſhadows are the ſame with thoſe already given, both for the ſun and the torch.

From what has been obſerved before may be drawn this concluſion, that the ſame object may project ſhadows of divers forms, though ſtill illumined on the ſame ſide; the ſun giving one form, the torch another, and the day-light no preciſe form at all.

The ſun always makes its ſhadow equal to the object, that is, projects it parallelwiſe.

It is certainly of conſequence to all painters, engravers, &c. to obſerve theſe rules preciſely, and not to take the rules for candles, lamps, and the like, in lieu thereof, as is too frequently done.

The ſhadow of a torch or flambeau, is not projected in parallel lines, but in rays proceeding from a center, whence the ſhadow is never equal to the body, but always bigger, and grows more ſo as it recedes farther off. It appears therefore a groſs abuſe to repreſent the ſhadow of a torch like that of the ſun, and the ſhadow of the ſun, like that of a candle, when the difference is ſo conſiderable.

There is a third kind of ſhadow, neither produced by the ſun nor a torch; but only a fine ſunny day, which wanting ſtrength to finiſh and define its form, occaſions a dimneſs near the object. Now for this there is no certain rule, but every body conducts it at diſcretion.

All theſe ſhadows, both of the ſun, of the torch, and of the day-light, muſt appear darker than the parts of objects not illumined; and that part of the ſhadow that is moſt remote from the object muſt be ſtill darker than that nearer it.

Shadow, in geography. The inhabitants of the terraqueous globe of the earth receive different denominations, according to the different ways wherein their ſhadows are projected; as aſcii, amphiſcii, heteroſcii, and periſcii. See the articles Ascii, &c.

Shadow, in painting, an imitation of a real ſhadow, effected by gradually heightening and darkening the colours of ſuch figures, as by their diſpoſitions cannot receive any direct rays from the luminary that

that is suppofed to enlighten the piece. The management of the fhadows and lights makes what the painters call claro-obfcuro. See CLARO OBSCURO.

*Genefis of curves by* SHADOWS. See the article CURVE.

SHAFT *of a column*, in building, is the body thereof between the bafe and capital: fo called from its ftraightnefs. See the article COLUMN.

The term fhaft is alfo ufed for the fpire of a church-fteeple, and for the tunnel of a chimney. See the articles SPIRE and CHIMNEY.

SHAFT, in mining, is the pit or hollow entrance into the mine. See MINE.

SHAFTSBURY, a borough of Dorfetfhire, twenty-five miles north-eaft of Dorchefter; from whence the noble family of Cooper took the title of earl.

It fends two members to parliament.

SHAG, or SHAGG, in ornithology, a fpecies of pelican, brown underneath, with twelve feathers in the tail; being very like the cormorant in fhape, but of a different colour: it is about the fize of a well fed duck, and is known among authors by the names corvus aquaticus minor, and graculus palmipes.

SHAGREEN, or CHAGREEN, in commerce, a kind of grained-leather, prepared, as is fuppofed, of the fkin of a fpecies of fqualus, or hound-fifh, called the fhagree, or fhagrain; and much ufed in covering cafes, books, &c.

It is imported from Conftantinople, Tauris, Tripoli, Algiers, and from fome parts of Poland, where it is prepared in the following manner: the fkin being ftretched out is firft covered over with muftard-feed, which is bruifed upon it: and being thus expofed to the weather for fome days, it is then tanned.

The beft is of a brownifh colour, as the white fort is the worft: it is extremely hard; yet, when fteeped in water, it becomes foft and pliable; and being fafhioned into cafe-covers, it readily takes any colour, as red, green, yellow, black, according to the fancy of the workman.

Each fhagreen fkin pays, on importation, a duty of $4\frac{78\frac{3}{4}}{100}$ d. and draws back, on exportation, $4\frac{51\frac{1}{4}}{100}$ d.

SHAKLES, in a fhip, are the rings with which the ports are fhut faft, by lafhing the port-bar to them. There are alfo fhakles put upon bilbow-bolts, for confining the men who have deferved corporal punifhment.

SHALLOP, or SHALLOOP, a particular fort of fhip. See the article SHIP.

SHAMADE, or CHAMADE. See the article CHAMADE.

SHAMBLES, among miners, a fort of niches, or landing places, left at fuch diftances in the adits of mines, that the the fhovel-men may conveniently throw up the ore from fhamble to fhamble, till it comes to the top of the mine. See the articles DIGGING, MINE, &c.

SHAMMY, or CHAMOIS-LEATHER, a kind of leather, dreffed either in oil or tanned; and much efteemed for its foftnefs, pliancy, and being capable of bearing foap without hurt.

The true fhammy is prepared of the fkin of the chamois-goat. See the article CHAMOIS.

In France, &c. fome wear the fkin crude without any preparation; it is alfo ufed for the purifying mercury, which is done by paffing it through the pores of this fkin, which are very clofe. See the article MERCURY.

The true chamois leather is counterfeited with common goat, kid, and even fheepfkin; the practice of which makes a particular profeffion, called by the French chamoifure. The laft is the leaft efteemed, yet fo popular, and fuch vaft quantities prepared, efpecially about Orleans, Marfeilles, and Tholoufe, that it may not be amifs to give the method of preparation.

The manner of chamoifing, or of preparing fheep, goat, or kid-fkins in oil, in imitation of chamois.

The fkins being wafhed, drained, and fmeared over with quick-lime, on the flefhy fide, are folded in two, lengthwife, the wool outwards, and laid on heaps, and fo left to ferment eight days; or if they had been left to dry after fleaing, for fifteen days.

Then they are wafhed out, drained, and half-dried, laid on a wooden leg or horfe, the wool ftripped off with a round ftaff for the purpofe, and laid in a weak pit, the lime whereof had been ufed before, and had loft the greateft part of its force.

After twenty-four hours they are taken out, and left to drain twenty-four more; then put in another ftrong pit. This done, they are taken out, drained, and put in again by turns; which begins to

difpofe them to take oil: and this practice they continue for fix weeks in fummer, or three months in winter; at the end whereof they are wafhed out, laid on the wooden leg, and the furface of the fkin on the wool fide peeled off, to render them the fofter; then, made into parcels, fteeped a night in the river; in winter, more; ftretched fix or feven over one another, on the wooden leg; and the knife paffed ftrongly on the flefh fide, to take off any thing fuperfluous, and render the fkin fmooth.

Then they are ftretched as before, in the river, and the fame operation repeated on the wool-fide; then thrown into a tub of water with bran in it, which is brewed among the fkins till the greateft part ftick to them; and then feparated into diftinct tubs, till they fwell and rife of themfelves above the water.

By this means, the remains of the lime are cleared out: they are then wrung out, hung up to dry on ropes, and fent to the mill, with the quantity of oil neceffary to fcour them: the beft oil is that of ftock-fifh.

Here they are firft thrown in bundles into the river for twelve hours, then laid in the mill trough, and fulled without oil till they be well foftened; then oiled with the hand, one by one, and thus formed into parcels of four fkins each, which are milled and dried on cords a fecond time, then a third; then oiled again and dried.

This procefs is repeated as often as neceffity requires: when done, if there be any moifture remaining, they are dried in a ftove, and made up into parcels wrapped up in wool; after fome time they are opened to the air, but wrapped up again as before, till fuch time as the oil feems to have loft all its force, which it ordinarily does in twenty-four hours.

The fkins are then returned from the mill to the chamoifer to be fcoured; which is done by putting them into a lixivium of wood-afhes, working and beating them in it with poles, and leaving them to fteep till the lye have had its effect; then wrung out, fteeped in another lixivium, wrung again, and this repeated till all the greafe and oil be purged out. They are then half dried, and paffed over a fharp-edged iron inftrument, placed perpendicular in a block, which opens, foftens, and makes them gentle: laftly, they are thoroughly dried, and paffed over the fame inftrument again, which finifhes the preparation, and leaves them in form of fhammy.

Kid and goat-fkins are chamoifed in the fame manner as thofe of fheep, excepting that the hair is taken off without the ufe of any lime; and that when brought from the mill they undergo a particular preparation called ramalling, the moft delicate and difficult of all the others.

It confifts in this, that as foon as brought from the mill they are fteeped in a fit lixivium: taken out, ftretched on a round wooden leg, and the hair fcraped off with the knife; this makes them fmooth, and in working caft a fine nap. The difficulty is in fcraping them evenly.

SHANK, in the manege, that part of a horfe's fore-leg which lies between the knee and the fetlock.

SHANK-PAINTER, in a fhip, a fhort chain faftened under the fore-fhrouds, by a bolt, to the fhip's fide; having at the other end a rope fpliced to the chain, on which the after part of the anchor refts when it lies by the fhip's fide.

SHANKER, or CHANCRE, in medicine, a malignant ulcer, ufually occafioned by fome venereal diforder. See the articles GONORRHOEA and POX.

Shankers are generally fituated on thofe parts which have a fine and tender covering, as the inward duplicature of the prepuce in men, the infide of the pudenda in women, the nipples of nurfes, and the lips and tongue of proftitutes; in very bad cafes they will appear on the dorfum penis, as well as on the pubes and infide of the thighs.

In the cure of a recent fhanker, Aftruc firft orders bleeding, to abate the inflammation, then fomentations to refolve the induration; not omitting mercurials in the mean time, but fo as to avoid a falivation. After which he advifes the ufe of fudorific decoctions of china, farfaparilla, guaiacum, and faffafras boiled with antimony. In flight fhankers, he recommends an ointment made of lapis calaminaris, half an ounce; of fulphur and quickfilver, each one dram; which are to be mixed with a fufficient quantity of turpentine to make an ointment. Cockburn fays, any fhanker may be cured with an ointment of quickfilver and turpentine, without farther trouble; and Heifter approves of the fame method. Turner fays, he always found fmoaking the parts with cinnabar fuccefsful in fhancrous ulcerations on the glans and prepuce

prepuce of men, as well as the labia and ſinus pudoris of women. His method was, to throw a dram of cinnabar on a hot iron, letting a fume aſcend through a funnel, or a ſeat perforated like a cloſe-ſtool all round the diſeaſed parts. This was done every day, and ſometimes twice a day, for a week; the iron being hot enough to raiſe a flame with ſmoak, but not ſo fiery hot as to make it inſtantly conſume in flame alone.

SHANNON, the largeſt river in Ireland, which riſing in the county of Leſtrim, runs ſouthwards, dividing the provinces of Leinſter and Connaught; and then turning ſouth-weſt, runs through the province of Munſter; and paſſing by the city of Limeric, afterwards falls into the weſtern or Atlantic ocean.

SHARE *of a plough*, that part which cuts the ground, the extremity forwards being covered with a ſharp-pointed iron, called the point of the ſhare; and the end of the wood behind, the tail of the ſhare. See the article PLOUGH.

The length of the whole ſhare, from point to tail, according to Tull, ſhould be three feet nine inches: at the top of the iron it has an upright piece, called the fin; and near the iron, at the other end, there is an oblong ſquared hollow, called the ſocket; the uſe of which is to receive the bottom of the ſheat. Near the tail there is a thin plate of iron, well rivetted to the wood; by means of this plate the tail of the ſhare is held firmly to the hinder ſheat of the plough by a ſmall iron pin, with a ſcrew at the end, and a nut ſcrewed on it, on the inner or right ſide of the ſheat.

The point of the ſhare is that part in which it does not run up into the fin: this point is generally made of three inches and a half in length, and ſhould be flat underneath and round at top, and the lower part of it muſt be of hard ſteel. The edge of the fin ſhould alſo be well ſteeled, and ſhould make an acute angle with the ſhare.

The ſocket is a ſort of mortiſe; it ſhould be a foot long, and about two inches deep: the fore end of it muſt not be perpendicular, but oblique, conformable to the end of the ſheat which enters into it. The upper edge of the fore part muſt be always made to bear againſt the ſheat; but if this end of the ſocket ſhould not be quite ſo oblique as the ſheat, it may be helped by paring off a ſmall part of the wood at the point.

SHARK, in ichthyology, the engliſh name of two ſpecies of ſqualus, diſtinguiſhed by their different colours, blue and white. See the article SQUALUS.

The blue ſhark, with a triangular foſſula on the back, and no foramina at the eyes, is a moſt terrible fiſh of prey; growing to ſix, ſeven, or eight feet in length, and conſiderably thick in proportion: the mouth is large, and furniſhed with large broad teeth, ſome of them ſerrated at the edges.

The white ſhark is flat-backed, and has more numerous teeth than the preceding ſpecies, being the largeſt of the whole genus of ſquali; and weighing, when full grown, not leſs than a thouſand pounds: it is called by authors lamia, and canis carcharius.

There is alſo another ſpecies called the zygæna, or hammer-headed ſhark. See the article ZYGÆNA.

SHARP, in muſic, a kind of artificial note; for the character and uſe of which, ſee the articles CHARACTER, FLAT, SCALE, *&c.*

SHARP, in the ſea-language, ſignifies to hale taut, or tight.

SHARPING CORN, a cuſtomary gift of corn, ſaid to be half a buſhel, for a plough-land, which the farmers pay in ſome parts of England to their ſmith, every Chriſtmas, for ſharping their plough-irons, harrow-tines, *&c.*

SHARPLING, one of the many names for the gaſteroſteus. See the article GASTEROSTEUS.

SHASTER, or SHASTRAM, a ſacred book, containing the religion of the Banians: it conſiſts of three tracts; the firſt of which contains their moral law; the ſecond, the ceremonial; and the third, delivers the peculiar obſervances for each tribe of Indians.

SHAW, in our old writers, ſignifies a grove of trees.

SHEADING, a term uſed in the Iſle of Man for a riding, tything, or diviſion of that iſle; the whole being divided into ſix of theſe ſheadings; in each of which there is a coroner or conſtable, who is appointed by the delivery of a rod at the tinewald-court, or annual convention.

SHEARING, or SHEERING. See the article SHEERING.

SHEAT *of a plough*, a part paſſing thro' the beam, and faſtened to the ſhare. See the articles PLOUGH and SHARE.

SHEATHING, in the ſea-language, is the caſing that part of a ſhip, which is to be

be under water, with fir-board of an inch thick; firſt laying hair and tar, mixed together, under the boards, and then nailing them on, in order to prevent worms from eating the ſhip's bottom.

SHEATS, in a ſhip, are ropes bent to the clews of the ſails; ſerving, in the lower ſails, to haul aft the clews of the ſail; but, in top-ſails, they ſerve to haul home the clew of the ſail cloſe to the yard-arm.

SHEEP, *ovis*, in zoology, a well known genus of quadrupeds, the horns of which are hollow, bent backward, twiſted, and rugoſe: the fore-teeth are eight, and the hinder ones are narrower than the others: there are no canine, or dog-teeth.

Authors mention ſeveral ſpecies of ſheep. 1. The common kind, with compreſſed and lunated horns; a very valuable, and not uncomely creature, covered with a thick and deep wool, curled and twiſted. 2. The cretic ſheep, with erect and ſpiral horns, and about the ſize of the common kind, which it greatly reſembles in form. 3. The angola-ſheep, with pendulous ears, a lax dewlap, and with the back of the head prominent: this ſpecies differs greatly from the common kind.

As to the choice of ſheep to breed, the ram ſhould be young, and his ſkin of the ſame colour with his wool, for the lambs will be of the ſame colour with his ſkin. He ſhould have a large long body, a broad forehead, round, and well riſing, large eyes, and ſtrait and ſhort noſtrils. The polled ſheep, that is thoſe which have no horns, are found to be the beſt breeders. The ewe ſhould have a broad back, a large bending neck, ſmall, but ſhort, clean and nimble legs, and a thick deep wool covering her all over. To know whether they be ſound or not, the farmer ſhould examine the wool, that none of it be wanting, and ſee that the gums be red, the teeth white and even, the briſket-ſkin red, the wool firm, the breath ſweet, and the feet not hot. Two years old is the beſt time for beginning to breed, and their firſt lambs ſhould not be kept too long, to weaken them by ſuckling, but be ſold as ſoon as conveniently may be. They will breed advantageouſly, till they are ſeven years old.

The farmers have a method of knowing the age of a ſheep, as that of a horſe is known by the mouth. When a ſheep is one ſhear, as they expreſs it, it has two broad teeth before; when it is two ſhears it will have four; when three, ſix; and when four, eight: after this their mouths begin to break. The difference of land makes a very great difference in the ſheep. The fat paſtures breed ſtrait, tall ſheep, and the barren hills and downs breed ſquare ſhort ones; woods and mountains breed tall and ſlender ſheep; but the beſt of all are thoſe bred upon new-plowed land, and dry grounds. On the contrary, all wet and moiſt lands are bad for ſheep, eſpecially ſuch as are ſubject to be overflowed, and to have ſand and dirt left on them. The ſalt marſhes are, however, an exception to this general rule, for their ſaltneſs makes amends for their moiſture; any thing of ſalt, by reaſon of its drying quality, being of great advantage to ſheep.

Sheep's dung is one of the beſt manures we know, ſucceeding better on cold lands than any other dung whatever; but as it is not ſo eaſily collected as the dung of large animals, it is commonly conveyed to the land, it is intended for, by folding the ſheep upon it. See the articles DUNG and FOLDING.

Sheep-ſtealing, or killing them, in order to obtain their fat, &c. is felony without benefit of clergy.

SHEERING, or SHEARING, in the woollen manufacture, is the cutting off, with large ſheers, the too long nap, in order to make the cloth more ſmooth and even. See the article CLOTH.

SHEERING, in the ſea-language; when a ſhip is not ſteered ſteadily, they ſay ſhe ſheers, or goes ſheering; or, when at anchor, ſhe goes in and out, by means of the current of the tide, they alſo ſay ſhe ſheers.

SHEERS, in a ſhip, are two maſts ſet acroſs at the upper end of each other; a contrivance generally uſed for ſetting or taking out the maſts of a ſhip, where there is no hulk to do that office.

SHEEVES, or SHIVERS. See SHIVERS.

SHEFFIELD, a market town of Yorkſhire, 38 miles ſouth-weſt of York.

SHEFFORD, a market-town of Bedfordſhire, ſeven miles ſouth of Bedford.

SHEFFNEL, a market-town of Shropſhire, fourteen miles eaſt of Shrewſbury.

SHEIK, an officer in the moſques of Egypt, whoſe buſineſs is the ſame with that of the imams of Conſtantinople. See IMAM.

SHEIK-BELLET, in the turkiſh affairs, a magiſtrate, anſwering to the mayor of a city with us.

SHEILDS, or SHEALS, a port-town of the biſhopric of Durham, ſituated at the mouth of the river Tyne, eight miles eaſt of Newcaſtle.

SHEKEL, in jewiſh antiquity, an antient coin, worth 2 s. 3 ¼ d. ſterling. See the article COIN.

Some are of opinion, that the Jews had two kinds of ſhekels, *viz.* the common one, already taken notice of, and the ſhekel of the ſanctuary; which laſt they make double the former, and conſequently equal to 4 s. 6½ d. But moſt authors make them the ſame; ſo that the ſhekel of the ſanctuary, according to them, is only worth 2 s. 3¼ d.

SHELF, among miners, the ſame with what they otherwiſe call faſt ground, or faſt country; being that part of the internal ſtructure of the earth, which they find lying even, and in an orderly manner, and, evidently having retained its primitive form and ſituation, unmoved by the waters of the general deluge, while the circumjacent, and upper ſtrata, have plainly been removed and toſſed about.

It is evident to reaſon, that there muſt have been a very violent concuſſion of the ſuperficial part of the earth, in the time of its being covered by the waters of the deluge; and experience as much evinces this as reaſon. Before this concuſſion it appears probable, that the uppermoſt ſurface of mineral veins, or loads, did in moſt places lie even with the then ſurface of the earth. The remains of this ſurface, found at different depths in digging, the miners expreſs by the word ſhelf. See MINE, TRACING, *&c.*

SHELL, *concha*, in natural hiſtory, a hard, and as it were ſtony covering, with which certain animals are defended, and thence called ſhell-fiſh.

As to the formation of a ſhell, it is now generally allowed to be formed by a viſcous fluid compoſed of glue, and ſeveral ſandy particles of an exquiſite fineneſs, which are tranſmitted through an infinite number of little channels to the pores where it tranſpires, condenſes, and hardens. When the animal increaſes in bulk, and the extremity of her body is not ſufficiently covered, it continues to evacuate and build in the ſame manner, finiſhing or repairing her habitation. This viſcous matter is proved, by undeniable experiments, to ariſe from the body of animals, and not from the ſhell, as ſome have imagined. Thoſe ſtreaks and clouds which we obſerve moſt ſhells to be beautified with, proceed, probably, from the different diſpoſition of the extreme parts of the animal's body that are viſible at the aperture of the ſhell, where we may frequently diſcover ſome minute lobes or lines of fleſh that differ from the reſt in colour, containing, perhaps, different juices which may acquire a particular complexion in that place; and many other different cauſes may concur to paint, vein, and diverſify the colours with a more or leſs lively glow. The quality of the food, the health or indiſpoſition of the animal, the inequality of its conſtitution according to the ſeveral periods of her age, and the changes that may happen to the different perforation of her ſkin; in ſhort, a thouſand accidents may intervene, to heighten or diminiſh certain tints, and diverſify the whole to infinity.

If the ſkill, in the variety of its colours, imitates the diverſity of the animal's pores, it is ſtill more apparent that it muſt aſſume the form of the body on which it is moulded. Thus we obſerve in all ſea ſhells, that if the animal has any ſwelling or inequality on its body, a tumour likewiſe riſes in the correſponding part of the incruſtation. When the creature diſplaces herſelf, and enlarges the dimenſions of her dwelling, the ſame tumour which had already raiſed the ſhell in one part, ſwells it anew at a little diſtance, by which means you ſee the ſame ſpecies of inequality in a winding line round the ſhell. Sometimes theſe protuberances of the animal are ſo large, or ſo pointed, that thoſe which riſe over them in the ſhell are like horns. She afterwards fills the inſides of theſe cavities, and then, by new evacuations of ſweat, ſtrikes out another ſet of horns, that protect her from fiſhes, who are fond of fleſh. If her body happens to be channelled, the ſhell that covers it has the ſame configuration: if the fleſh riſes in ſwellings, that wind round her in the form of a ſcrew, the ſhell has likewiſe its elevations and depreſſions, that are carried on in a ſpiral line from her tail to the extremity of her body.

The genera of ſhells are extremely numerous, and the ſpecies under many of them are alſo very much ſo. However, they may be divided into three ſeries or orders; the firſt comprehending all ſhells formed only of one piece, called by authors ſimple or univalve ſhells; the

SHELLS

*Order 1.* Univalves



*The Cochlea with a Semicircular Mouth*

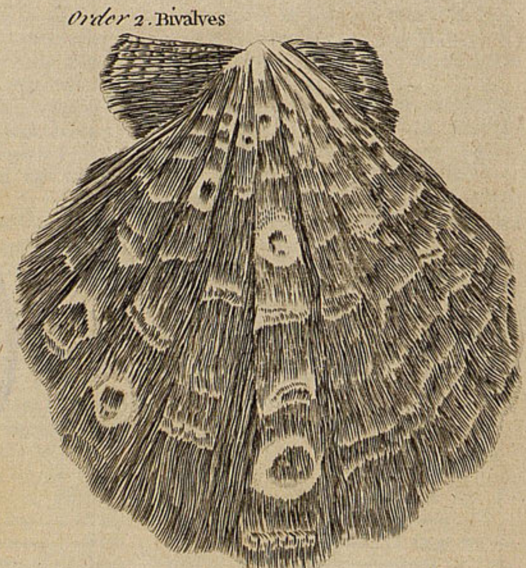


*The Paper-Nautilus*

*Order 2.* Bivalves



*The Carolina-Muscle*



*The Coral-Scallop*

*Order 3.* Multivalves



*The Bluish Polliceps*

*T. Jefferys sculp*

second, all those shells composed of two parts, or valves, under the name of bivalves; and the third, all shells composed of several parts, or valves, under the name of multivalves. See BIVALVES, MULTIVALES, and UNIVALVE.

This method takes in all the shells hitherto known; the land, as well as the sea-shells, being all comprehended under one or other of the foresaid divisions: indeed, all the recent land-shells are univalves; but the fossil-shells belong to all the three series. See plate CCXLVI.

*Fossil*-SHELLS, those found buried at great depths in earth, and often immersed in the hardest stones. These fossil-shells, as well as those found lying on the sea-shore, make an excellent manure, especially for cold clayey lands; upon which it does not produce nearly so great an effect for the two first years, as it does in the succeeding ones; the reason of which is, that it is not then sufficiently mixed, but in succeeding time it breaks itself into a number of very small particles, and these all become intimately blended with the molecules of earth, and produce their effect more properly.

*Polishing of* SHELLS. See POLISHING.

SHELTIE, a small but strong kind of horse, so called from Shetland, or Zetland, where they are produced.

SHEPPEY, an island at the mouth of the river Medway, making part of the county of Kent.

SHEPTON MALLET, a market-town, fifteen miles south-west of Bath.

SHERARDIA, in botany, a genus of plants, belonging to the tetrandria-monogynia class: its flower is monopetalous and tubular, divided into four segments at the limb; and its fruit is an oblong body, separable longitudinally into two oblong seeds, convex on one side, and plane on the other, and with three points at their summit.

SHERBORN, a market-town, 12 miles south-west of York.

SHERBRO, a fort at the mouth of the river Sherbro, in Guinea, formerly in the possession of the English.

SHERENESS, a fort on the north-west part of the isle of Sheppey, situated at the mouth of the river Medway, to defend its entrance.

SHERIFF, an officer in each county of England, nominated by the king, invested with a judicial and ministerial power, and who takes place of every nobleman in the county, during the time of his office. His judicial authority consists in hearing and determining causes in his county-court, and in keeping the peace of the county; he being by the common law the principal conservator of the peace there; for which reason he is to assist the justices, and raise the posse comitatus when occasion requires; and such persons, as on a hue and cry he shall apprehend upon suspicion of felony, he is to commit to prison; he may also imprison any one who breaks the peace in his presence. The ministerial office of the sheriff consists in proclaiming statutes, and making returns of writs for electing knights of the shire, &c. He collects the king's rents, seizes the profits of lands forfeited, and the goods of felons, levies the king's debts, fines, amercements, &c. and is accountable to the king for the profits of the county, on which account the sum of 4000 l. is set apart annually allowed to the sheriffs of the several counties of England, to help them to pass their accounts, and to defray their expences at the assizes, &c. where no sheriff is obliged to keep a table for the entertainment of any persons but those of his own retinue; neither is he to have above forty servants in livery, or less than twenty attending him. It is also his office to execute the writs and processes out of the king's court; and no process is to be served but by the sheriff. He returns juries for trials, as well in civil as in criminal cases, except where there is cause of challenge against him, in which case they are to be returned by the coroner. And, lastly, the sheriff is to see that criminals are executed, and the order of law observed in putting them to death. A sheriff has usually under him an under-sheriff, bailiffs, and a gaoler, for all of whom he is answerable. An under-sheriff ought always to have his deputy in the courts of justice, in order to receive their commands, and give an account of business, &c. All returns made by the under-sheriff are in the name of the high-sheriff; for every default in the execution of his office, either by fraud or neglect, the high-sheriff is amerceable in the exchequer. On the death of any sheriff, the under-sheriff shall officiate in his name, till another is appointed, and also to be answerable, &c.

In London, the lord mayor and citizens elect their sheriffs; and by a by-law of the

the city, if any perſon refuſe to take upon him the office, he is to pay 420 l. fine, unleſs he makes oath that he is not worth 10,000 l.

SHEW-BREAD, among the Hebrews, the name given to thoſe loaves of bread which the prieſts placed every ſabbath-day upon the golden table in the ſanctuary. The ſhew-bread conſiſted of twelve loaves, according to the number of the tribes; theſe were ſerved up hot on the ſabbath-day, and at the ſame time the ſtale ones which had been expoſed all the week were taken away. It was not lawful for any one to eat of thoſe loaves but the prieſts only: this offering was accompanied with ſalt and frankincenſe, which was burnt upon the table at the time they ſet on freſh loaves.

SHIELD, an antient weapon of defence, in the form of a light buckler, borne on the arm, to turn off lances, darts, *&c.*

SHIELD, in heraldry, the eſcutcheon or field on which the bearings of coats of arms are placed. See ESCUTCHEON.

SHILLING, an engliſh ſilver-coin. See the article COIN.

It is obſerved that there were no ſhillings or twelve-penny pieces in England till the year 1504. when they were firſt coined by Henry VIII.

SHINGLES, in building, ſmall pieces of wood, or quartered oaken boards, ſawn to a certain ſcantling, or, as is more uſual, cleft to about an inch thick at one end, and made like wedges, four or five inches broad, and eight or nine inches long.

Shingles are alſo uſed inſtead of tiles or ſlates, eſpecially for churches and ſteeples: however this covering is dear; yet where tiles are very ſcarce, and a light covering is required, it is preferable to thatch; and where they are made of good oak, cleft, and not ſawed, and well ſeaſoned in water and the ſun, they make a ſure, light, and durable covering.

The building is firſt to be covered all over with boards, and the ſhingles nailed upon them.

SHINGLES, in medicine, a kind of herpes. See the article HERPES.

SHIP, *navis*, a general name for all large veſſels with ſails, fit for navigation on the ſea; except galleys, which go with oars and ſmack-ſails. See NAVIGATION, NAVAL AFFAIRS, and NAVY.

A ſhip is undoubtedly the nobleſt machine that ever was invented; and conſiſts of ſo many parts, that it would require a whole volume to deſcribe it minutely. However, we ſhall endeavour to ſatisfy the reader the more fully on this head, as it is an article of the utmoſt importance, of which no gentleman ſhould be ignorant: and firſt to give an idea of the ſeveral parts and members of a ſhip, both external and internal, with their reſpective names in the ſea-language, in plate CCXLVII. is repreſented a ſhip of war of the firſt rate, with rigging, *&c.* at anchor; where A is the cat-head; B, the fore-chains; C, the main-chains; D, the mizzen-chains; E, the entring-port; F, the hawſe-holes; G, the poop-lanterns; H, the cheſs-tree; I, the head; K, the ſtern.

L, the bowſprit; 1, 2, yard and ſail; 3, gammoning; 4, horſe; 5, bob-ſtay; 6, ſprit-ſail ſheets; 7, pendants; 8, braces and pendants; 9, halliards; 10, lifts; 11, clew-lines; 12, ſprit-ſail horſes; 13, bunt-lines; 14, ſtanding lifts; 15, ſprit-ſail top; 16, flying jib-boom; 17, flying jib-ſtay and ſail; 18, halliards; 19, ſheets; 20, horſes.

M, the ſprit-ſail top-maſt; 21, ſhrouds; 22, 23, yard and ſail; 24, ſheet; 25, lifts; 26, braces and pendants; 27, cap; 28, jack-ſtaff; 29, truck; 30, jack-flag.

N, the fore maſt; 31, runner and tackle; 32, 33, ſhrouds; 34, laniards; 35, ſtay and laniard; 36, preventer-ſtay and laniard; 37, woolding the maſt; 38, yard and ſail; 39, horſes; 40, top; 41, crow-foot; 42, jeers; 43, yard-tackles; 44, lifts; 45, braces and pendants; 46, ſheets; 47, fore-tacks; 48, bow-lines and bridles; 49, fore bunt-lines; 50, fore leech-lines; 51, fore top-rope; 52, puttock-ſhrouds.

O, the fore-top-maſt; 53, 54, ſhrouds and laniards; 55, yard and ſail; 56, ſtay and ſail; 57, runner; 58, back-ſtays; 59, halliards; 60, lifts; 61, braces and pendants; 62, horſes; 63, clew-lines: 64, bow-lines and bridles; 65, reef-tackles; 66, ſheets; 67, bunt-lines; 68, croſs-trees; 69, cap.

P, the fore-top gallant-maſt; 70, 71, ſhrouds and laniards; 72, yard and ſail; 73, back-ſtays; 74, ſtay; 75, lifts; 76, clew-lines; 77, braces and pendants; 78, bow-lines and bridles; 79, flag-ſtaff; 80, truck; 81, flag-ſtaff-ſtay; 82, flag of lord high-admiral.

Q, the main-maſt; 83, 84, ſhrouds; 85, laniards; 86, runner and tackle; 87, pendant of the gornet; 88, guy or ditto. 89, ſail of ditto. 90, ſtay; 91, preventer-ſtay; 92, ſtay-tackle; 93, woolding



A First Rate SHIP of War, with Rigging &c.

J. Jefferys sculp.

woolding the maſt; 94, jeers; 95, yard-tackles; 96, lifts; 97, braces and pendants; 98, horſes; 99, ſheets; 100, tacks; 101, bow-lines and bridles; 102, crow-foot; 103, top-rope; 104, top; 105, bunt-lines; 106, leech-lines; 107, yard and ſail.

R, the main-top-maſt; 108, 109, ſhrouds and laniards; 110, yard and ſail; 111, puttock-ſhrouds; 112, back-ſtays; 113, ſtay; 114, ſtay-ſail and ſtay and halliards; 115, runnets; 116, halliards; 117, lifts; 118, clew-lines; 119, braces and pendants; 120, horſes; 121, ſheets; 122, bow-lines and bridles; 123, bunt-lines; 124, reef-tackles; 125, croſs-trees; 126, cap.

S, the main-top gallant-maſt; 127, 128, ſhrouds and laniards; 129, yard and ſail; 130, back-ſtays; 131, ſtay; 132, ſtay-ſail and halliards; 133, lifts; 134, braces and pendants; 135, bow-lines and bridles; 136, clew-lines; 137, flag-ſtaff; 138, truck; 139, flag-ſtaff-ſtay; 140, flag-ſtandard.

T, the mizzen-maſt; 141, 142, ſhrouds and laniards; 143, pendants and burtons; 144, yard and ſail; 145, crow-foot; 146, ſheet; 147, pendant-lines; 148, peck-brails; 149, ſtay-ſail; 150, ſtay; 151, derric and ſpann; 152, top; 153, croſs jack-yard; 154, croſs jack-lifts; 155, croſs jack-braces; 156, croſs jack-ſlings.

V, the mizzen-top-maſt; 157, 158, ſhrouds and laniards; 159, yard and ſail; 160, back-ſtays; 161, ſtay; 162, halliards; 163, lifts; 164, braces and pendants; 165, bow-lines and bridles; 166, ſheets; 167, clew-lines; 168, ſtay-ſail; 169, croſs-trees; 170, cap; 171, flag-ſtaff; 172, flag-ſtaff-ſtay; 173, truck; 174, flag-union; 175, enſign-ſtaff; 176, truck; 177, enſign; 178, poop-ladder; 179, bower-cable.

Thus we have pointed out the external parts, maſts, rigging, *&c.* an account of all which may be ſeen under their reſpective articles Mast, Hull, Rope, Rudder, *&c.*

In plate CCXLVIII. is repreſented the ſection of a firſt rate ſhip of war, ſhewing the inſide thereof: where A is the head; containing, 1, the ſtem; 2, the knee of the head, or cut-water; 3, the lower and upper cheek; 4, the tail-board; 5, the figure; 6, the gratings; 7, the brackets; 8, the falſe ſtem; 9, the breaſt-hooks; 10, the hauſe-hole; 11, the bulk-head, forward; 12, the cat-head; 13, the cat-hook; 14, neceſſary ſeats; 15, the manger within board; 16, the bow-ſprit.

B, upon the fore-caſtle; 17, the gratings; 18, the partners of the fore-maſt; 19, the gun-wale; 20, the belfry; 21, the funnel for the ſmoak; 22, the gang-way going off the fore-caſtle; 23, the fore-caſtle guns.

C, in the fore-caſtle; 24, the door of the bulk-head, forward; 25, the officers cabbins; 26, the ſtair-caſe; 27, the fore-top-ſail-ſheet bits; 28, the beams; 29, the car-lines.

D, the middle-gun-deck forward; 30, the fore-jeer bits; 31, the oven and furnace of copper; 32, the captain's cook-room; 33, the ladder, or way up into the fore-caſtle.

E, the lower-gun-deck forward; 34, the knees fore and aft; 35, the ſpirketings, or the firſt ſtreak next to each deck; the next under the beams being called clamps; 36, the beams of the middle gun deck, fore and aft; 37, the car-lines of the middle gun-deck, fore and aft; 38, the fore-bits; 39, the after or main-bits; 40, the hatchway to the gunner's and boatſwain's ſtore-rooms; 41, the jeer capſton.

F, the orlop; 42, 43, 44, the gunner's boatſwain's, and carpenter's ſtore-rooms; 45, the beams of the lower-gun-deck; 46, 47, the pillars and the riders, fore and aft; 48, the bulk-head of the ſtore-rooms.

G, the hold; 49, 50, 51, the foot-hook-rider, the floor-rider, and the ſtandirt, fore and aft; 52, the pillars; 53, the ſtep of the fore-maſt; 54, the keelſon, or falſe keel, and dead riſing; 55, the dead wood.

H, a-midſhips in the hold; 56, the floor-timbers; 57, the keel; 58, the well; 59, the chain-pump; 60, the ſtep of the main-maſt; 61, 62, beams and car-lines of the orlop, fore and aft.

I, the orlop a-midſhips; 63, the cable-tire; 64, the main hatchway.

K, the lower gun-deck a-midſhips; 65, the ladder leading up to the middle gun-deck; 66, the lower tire or ports.

L, the middle gun-deck a-midſhips; 67, the middle tire ports; 68, the entring-port; 69, the main jeer-bits; 70, twiſted pillars or ſtantions; 71, the capſton; 72, the gratings; 73, the ladder leading to the upper deck.

M, the upper gun-deck a-midſhips; 74, the main-top-ſail-ſheet bits; 75, the upper partners of the main-maſt; 76, the gallows on which ſpare top-maſts, *&c.*

*&c.* are laid; 77, the fore sheet-blocks; 78, the rennets; 79, the gun-wale; 80, the upper gratings; 81, the drift-brackets; 82, the piss-dale; 83, the capston-pall.

N, abaft the main-mast; 84, the gang-way off the quarter-deck; 85, the bulk-head of the coach; 86, the stair-case down to the middle gun-deck; 87, the beams of the upper deck; 88, the gratings about the main-mast; 89, the coach, or council-chamber; 90, the stair-case up to the quarter-deck.

O, the quarter-deck; 91, the beams; 92, the car-lines; 93, the partners of the mizzen mast; 94, the gangway up to the poop; 95, the bulk-head of the cuddy.

P, the poop; 96, the trumpeter's cabbin; 97, the tafferel.

Q, the captain-lieutenant's cabbin.

R, the cuddy, usually divided for the master and secretary's officers.

S, the state-room, out of which is made the bed-chamber, and other conveniencies for the commander in chief; 98, the entrance into the gallery; 99. the bulk-head of the great cabbin; 100, the stern-lights and after-galleries.

T, the ward-room, allotted for the lieutenants and land-officers; 101, the lower gallery; 102, the steerage and bulk-head of the ward-room; 103, the whipstaff, commanding the tillar; 104, the after-stair-case down to the lower gun-deck.

V, several officers cabbins abaft the main-mast, where the soldiers generally keep guard.

W, the gun-room; 105, the tillar commanding the rudder; 106, the rudder; 107, the stern-post; 108, the tillar-transom; 109, the several transoms, *viz.* 1, 2, 3, 4, 5; 110, the gun-room-ports, or stern-chase; 111, the bread-room-scuttle, out of the gun-room; 112, the main-capston; 113, the pall of the capston; 114, the partner; 115, the bulk-head of the bread-room.

X, the bread-room; Y, the steward's room, where all provisions are weighed and served out; Z, the cock-pit, where are subdivisions for the purser, the surgeon, and his mates.

AA, the platform, or orlop, where provision is made for the wounded in time of service; 116, the hold abaft the main-mast; 117, the step of the mizen mast; 118, the keelson, or false keel; 119, the dead-wood, or rising.

*Different kinds of* SHIPS. All ships at first were of the same form, whatever uses they were designed for; but the various ends of navigation, some of which were better answered by one form, some by another, soon gave occasion to build and fit out ships, not only different in bigness, but also in their construction and rigging: and as trade gave occasion to the fitting out large fleets of different kinds of merchant-ships; so ships of war became necessary to preserve them to their just proprietors. These last, or ships of war, have three masts and a bowsprit, and are sailed with square sails; the other parts being as described above, and represented in plate CCXLVII.

But besides these, there are other forms: as, 1. The bilander, (plate CCXLVIII. fig. 2.) which has rigging and sails, not unlike a hoy only broader and flatter: bilanders are seldom above twenty-four tuns, and can lie nearer the wind than a vessel with cross-sails can do. 2. Bomb-vessels (*ibid.* fig. 3.) have sometimes three masts, and square sails, as represented; but they are also frequently ketch-fashion, with one mast and a mizen. 3. Brigantines (*ibid.* fig. 4.) are now disused, but had two masts, and square sails. 4. Hagboats (*ibid.* fig. 5.) are masted and sailed ship-fashion, but are built in the form of the dutch fly-boats. 5. Hoys (*ib.* fig. 6.) are fitted with one mast and a sprit-sail; whose yards stand fore and aft like a mizen, so that it can lie near the wind. 6. Hulks (*ib.* fig. 7.) are generally old ships cut down to the gun-deck, and fitted with a large wheel, for men to go in when careening: it has also several capstons fixed on its deck, for setting ship's masts. 7. Ketches (*ibid.* fig. 8.) are fitted with two masts, and their main-sail and top-sail stand square, as those of ships do; but their fore-sail and jibbs, as those of hoys do. 8. Lighters (*ib.* fig. 9.) are vessels made use of for laying down or shifting the moorings, for bringing ashore or carrying on broad ships cables, anchors, *&c.* 9. Pinks (*ibid.* fig. 10.) sail with three masts, ship-fashion, but are round sterned, with a small projection above the rudder. 10. Punts (*ib.* fig. 11.) are built square, and used about the docks for fetching clay, and other services as the master ship-wright wants them for. 11. Shallop (*ib.* fig. 12.) is a small light vessel, with only a small main and fore-mast, and lugg-sails, to haul up and let down on occasion. 12. Sloops (*ibid.* fig. 13.) have only one mast, with shoulder of mutton, square, lugg, and

ſmack ſails. 13. Smacks (*ibid.* fig. 14.) are tranſporting veſſels, with one maſt, and an half ſprit-ſail. 14. Yachts (*ibid.* fig. 15.) have only one maſt, with an half ſprit or ſmack-ſail, and ſometimes ketch-faſhion. See the articles BILANDER, BOMB-KETCH, BRIGANTINE, *&c.*

*Conſtruction of* SHIPS. Naval architecture may be divided into three principal parts: 1. To give the ſhip ſuch a figure and proportion, as may ſuit the ſervice ſhe is deſigned for. 2. To find the true form of all the pieces of timber that ſhall be neceſſary to compoſe ſuch a ſolid. 3. To make proper accommodations for guns, ammunition, proviſions, and apartments for all the officers, and likewiſe room for the cargo.

As to the firſt part, the length of the keel, greateſt breadth, depth in the hold, height between decks and in the waſte, and ſometimes the height and breadth of the wing-tranſom, in ſhips for the merchants ſervice, are agreed on by contract; and from theſe dimenſions the builder forms a draught ſuitable to the trade the ſhip is deſigned for. The firſt thing that is generally done, is to lay down the keel, the ſtem, and ſtern poſt upon the ſheer-plane, or plane ſuppoſed to paſs through the middle line of the keel, ſtem, and ſtern-poſt, cutting the ſhip in two halves lengthwiſe. They next determine the proper ſtation of the mid ſhip-timber, where a perpendicular is erected; and is generally about two thirds of the keel before the ſtern-poſt: on this line the given depth of the hold is ſet off, from the upper-ſide of the keel; to obtain which point, the thickneſs of all the timber and plank muſt be added to the height agreed on. This being fixed, will enable us to determine the upper-height of the extreme or greateſt breadth of the ſhip; which, ſometimes, is that very point; and from the ſame place the lower height of the breadth muſt be determined. The two main heights of the breadth-lines, which nearly unite abaft and afore, are next determined. The height of the breadth-line of the top-timber is next formed; being limited in the midſhip by contract, but afore and aft only by the judgment and fancy of the artiſt. If a ſquare ſtern is deſigned, the breadth at the wing-tranſom is limited, being generally about two thirds of the greateſt breadth. The artiſt next fixes the breadth of the top-timber, and then deſcribes the two half-breadth lines. After theſe are formed, the places where the ſeveral timbers are fixed: and for forming the midſhip-frame, radii are aſſumed at pleaſure, till the ſweeps are made to pleaſe the fancy and judgment of the artiſt. When this midſhip-frame is formed, a pattern or mould is made to fit exactly to the curve, and the dead-riſing or water-line; and by this and a hollow mould, all the timbers are formed, as far as the riſing-line, which is parallel to the lower height of the breadth-line.

We come next to conſider the upper-works, or all that is above water, called the dead-work: and here the ſhip muſt be narrower, by which means ſhe will ſtrain leſs by working the guns, and the main-ſail will be eaſier trimmed, as the ſhrouds ſpread leſs than they would otherwiſe do. But though theſe advantages are gained by narrowing a ſhip above water, yet great care muſt be taken not to narrow her too much, leſt there ſhould not be ſufficient room upon the upper deck for the guns to recoil. The ſecurity of the maſts ſhould likewiſe be conſidered, which require ſufficient breadth to ſpread the ſhrouds: though this may be aſſiſted by enlarging the breadth of the channels.

*Principal qualities belonging to* SHIPS. A ſhip of war ſhould carry her lower tire of guns four or five feet above water; a ſhip for the merchants ſervice ſhould ſtow the cargo well: and both of them ſhould be made to go well, carry a good ſail, ſteer well, and lie-to eaſily in the ſea. 1. To make a ſhip carry a good ſail, Mr. Du Hamel recommends a flat floor timber, and ſomewhat long, or the lower futtock pretty round; alſo a ſtraight upper futtock, and the top-timber to throw the breadth out aloft; and at any rate, to carry her main-breadth as high as the lower-deck; for if the rigging be well adapted to ſuch a body, and the upper-works heightened as much as poſſible ſo as all to concur to lower the center of gravity, there will be no room to doubt of her carrying a good ſail. 2. To make a ſhip ſteer well, and anſwer the leaſt motion of the helm, the faſhion-pieces ſhould be well formed, the tuck carried pretty high, and the midſhip-frame carried pretty forward; alſo there ſhould be a conſiderable greater draught of water abaft than afore, a great rake forward, and none abaft, and a ſnug quarter-deck and fore-caſtle: all theſe will make a ſhip ſteer well. But to make her feel the leaſt motion of her helm, it will be neceſſary to regard her maſts; for a

ſhip that goes well, will certainly ſteer well. 3. To make a ſhip carry her guns well out of the water, is effected by a long floor-timber, and not of great riſing, a very full midſhip-frame, and low tuck, with light upper-works. 4. To make a ſhip go ſmoothly through the water, without pitching hard, her keel ſhould be long, her floor long and not riſing high afore or aft; the area or ſpace contained in the fore body ſhould alſo be duly proportioned to that of the after body, according to the reſpective weights they are to carry 5. To make a ſhip keep a good wind, ſhe ſhould have a good length by the keel, not too broad, but pretty deep in the hold; which will make her floor-timber ſhort, and riſing great. As ſuch a ſhip will meet with great reſiſtance in the water going over the broad ſide, and but little when going a-head, ſhe will not fall much to the leeward. Now ſome ſhip-builders imagine, that it is impoſſible to make a ſhip carry her guns well, carry a good ſail, and be a prime ſailer at the ſame time, becauſe it requires a very full bottom to gain the two firſt qualities, and a ſharp bottomed ſhip beſt anſwers the latter: but when it is conſidered, that a full ſhip will carry a great deal more ſail than a ſharp one, a good artiſt may ſo form the body as to have all theſe three good qualities united, and likewiſe ſteer well: for which purpoſe, Mr. Du Hamel recommends ſomewhat more in length than has been commonly practiſed.

SHIPTON, a market-town, twenty-four miles ſouth-eaſt of Worceſter.

SHIRE, in geography, ſignifies the ſame as county; being originally derived from the ſaxon ꞅcıꞃan, *to divide*. See the articles COUNTY, SHERIFF, and *Lord* LIEUTENANT.

SHIVERS, or SHEEVERS, in the ſea-language, names given to the little rollers or round wheels of pulleys. See the article PULLEY.

SHOAD, among miners, denotes a train of metalline ſtones, ſerving to direct them in the diſcovery of mines. See MINE.

SHOAL, in the ſea-language, denotes a place where the water is ſhallow.

SHOAR, or SHORE. See SHORE.

SHOE, *calceus*, a covering for the foot, uſually made of leather, by the company of cordwainers. See CORDWAINERS.

*Horſe* SHOES. See the article HORSE.

SHOE *for an anchor*, in a ſhip, the place for the anchor to reſt, and fitted to receive the ſtock, &c. ſo as to prevent the ſheets, tacks, and other running-rigging, from galling, or being entangled with the flooks.

SHOOTING. See the articles GUNNERY and PROJECTILES.

SHORE, or SHOAR, a place waſhed by the ſea, or by ſome large river.

Count Marſigli divides the ſea-ſhore into three portions; the firſt of which is that tract of land which the ſea juſt reaches in ſtorms and high tides, but which it never covers; the ſecond part of the ſhore, is that which is covered in high tides and ſtorms, but is dry at other times; and the third is the deſcent from this, which is always covered with water. See SEA.

The firſt part is only a continuation of the continent, and ſuffers no alteration from the neighbourhood of the ſea, except that it is rendered fit for the growth of ſome plants, and wholly unfit for that of others, by the ſaline ſteams and impregnations: and it is ſcarce to be conceived by any, but thoſe who have obſerved it, how far on land the effects of the ſea reach, ſo as to make the earth proper for plants, which will not grow without this influence; there being ſeveral plants frequently found on high hills, and dry places, at three, four, and more miles from the ſea, which yet would not grow, unleſs in the neighbourhood of it, nor will ever be found elſewhere.

The ſecond part or portion of the ſhore is much more affected by the ſea than the former, being frequently waſhed and beaten by it. Its productions are rendered ſalt by the water, and it is covered with ſand, or with the fragments of ſhells in form of ſand, and in ſome places with a tartarous matter depoſited from the water; the colour of this whole extent of ground is uſually duſky and dull, eſpecially where there are rocks and ſtones, and theſe covered with a ſlimy matter.

The third part of the ſhore is more affected by the ſea than either of the others, and is covered with an uniform cruſt of the true nature of the bottom of the ſea, except that plants and animals have their reſidence in it; and the decayed parts of theſe alter it a little.

SHOREHAM, a borough and port town of Suſſex, twenty five miles eaſt of Chicheſter.

It ſends two members to parliament.

SHORT-SIGHTEDNESS, *myopia*, in medicine. See the article MYOPIA.

SHOT, a denomination given to all ſorts of balls for fire arms; thoſe for cannon being

being of iron, and thofe for guns, piftols, *&c.* of lead.

For the method of granulating fhot for the ufe of fowlers, fee GRANULATION.

*Trundle*-SHOT, an iron-fhot, about feventeen inches long, and fharp-pointed at both ends, with a ball of lead faftened upon it, about a hand-breadth from each end.

SHOTTEN, or *Blood*-SHOTTEN. See the article BLOOD.

SHOVELER, in ornithology, a fpecies of the anas, with the extremity of the beak broad and round, and its ungues bent. See the article ANAS.

SHOULDER-BONE, *humerus*, in anatomy. See the article HUMERUS.

SHOULDER BLADE, *fcapula.* See the article SCAPULA.

SHOULDER-PITCHED, among farriers, is faid of a horfe whofe fhoulder is difplaced, which may be remedied by fwimming the horfe a dozen times up and down in deep water.

SHOULDER-SPLAIT, is when a horfe's fhoulder is parted from the breaft.

SHOULDERING PIECE, among builders, the fame with a bracket. See the article BRACKET.

SHOWER, in meteorology, a cloud refolved into rain. See the article RAIN.

SHREW-MOUSE, or *Hardy*-SHREW, *forex*, or *mus araneus*, in zoology, a genus of quadrupeds, of the order of the glires; the upper fore-teeth of which are bifid, and the lower ones ferrated: the upper canine-teeth are very fmall, and four in number.

The fhrew-moufe is an extremely fingular little animal, which greatly refembles the common moufe, but is fomewhat fmaller.

SHREWSBURY, the county-town of Shropfhire, fituated on the river Severn: weft long. 2° 46′, north lat. 52° 46′. It fends two members to parliament.

SHRIMP, in ichthyology, the englifh name of two different fpecies of the fquilla, *viz.* the common fhrimp, and the fmooth-nofed fhrimp. See SQUILLA.

The common fhrimp is the long-tailed fquilla, with the fnout ferrated above and tridentated below; the body is oblong and rounded above the beak or fnout; which diftinguifhes it from all the other fpecies: it is long, of a lanceolated figure, fharp-pointed, and has eight denticulations above, and three below. The fmooth-nofed fhrimp, or long-tailed fquilla, with a fmooth fnout, grows to the fame fize with the common fhrimp; however the body is thick, and the fnout is very fhort, without the fpines or denticulations of the other.

SHRINE, in ecclefiaftical hiftory, a cafe or box, to hold the relics of fome faint. See the articles RELICS and SAINT.

SHRITE, in ornithology, the fame with the miffel-bird. See MISSEL.

SHROPSHIRE, a county of England, bounded by Chefhire on the north, by Staffordfhire on the eaft, by Herefordfhire on the fouth, and by Montgomeryfhire on the weft.

SHROUDS, or SHROWDS. See the article SHROWDS.

SHROVE-TUESDAY, is the Tuefday after quinquagefima Sunday, or the day immediately preceding the firft of lent; being fo called from the faxon word *ſhrive*, which fignifies *to confefs*, as having been employed by the people in time of popery, in confeffing their fins, in order to receive the facrament, and thereby qualify themfelves for a more religious obfervation of lent. See the article LENT.

In procefs of time this cuftom was changed into that of mutual invitations, in order to take leave of flefh-meat and other dainties; and this made way for fports and other merriments which at prefent make up the whole bufinefs of the carnival, or feafon immediately preceding lent. See the article CARNIVAL.

SHROWDING *of trees*, the cutting or lopping off their top branches; which is practifed only on trees not fit for timber, and defigned to yield a prefent advantage, and ferve for fuel.

Trees fhould be three or four years old before they are fhrowded, which fhould be done in winter for the harder forts of wood, and in fpring for the fofter kinds, taking care to cut the remaining ftump aflope and fmooth.

SHROWDS, or SHROUDS, in a fhip, are the great ropes which come down both fides of the mafts, and are faftened below to the chains on the fhip's fide, and aloft to the top of the maft; being parcelled and ferved, in order to prevent the maft's galling them. The top-maft-fhrowds are faftened to the puttock-plates, by dead eyes and laniards, as the others are. See the article SHIP.

Some of the terms relating to the fhrowds are: eafe the fhrowds; that is, flacken them: and, fet up the fhrowds; that is, fet them ftiffer.

SHRUB, *frutex*, among naturalifts, denotes

notes a dwarf-tree, or a woody plant lefs than a tree: fuch are holly, box, privet, &c.

SHUTTLE, in the manufactures, an inftrument much ufed by weavers, in the middle of which is an eye, or cavity, wherein is inclofed the fpoul with the woof. See the article WEAVING.

SI, in mufic, a feventh note or found, added by Le Maire to the fix antient notes invented by Guido Arentine, *viz. ut, re, mi, fa, fol, la, fi*. See the articles GAMUT, SCALE, and SOLFAING.

SIAM, the capital of a kingdom of the fame name, in the farther peninfula of India: eaft long. 101°, north lat. 14°.

SIBA, a province of the hither India, fituated between Tibet on the eaft, and Lahor on the weft.

SIBALDIA, in botany, a genus of the pentandria-pentagynia, clafs of plants, the flower of which confifts of five oval petals; and its feeds, which are five in number, are contained in the bottom of the cup, which clofes for that purpofe.

SIBERIA, or ASIATIC RUSSIA, the moft northern country of Afia, fituated between 60° and 130° eaft longitude, and between 47° and 72° north latitude; being upwards of two thoufand miles in length from eaft to weft, and one thoufand five hundred miles in breadth from north to fouth. We include the Calmuc Tartars within the limits of Siberia, as they acknowledge themfelves fubject to the empire of Ruffia.

SIBIT, a town of Arabia Fœlix, fituated in eaft long. 45°, north lat. 15°.

SIBTHORPIA, in botany, a genus of the didynamia-angiofpermia clafs of plants, the calyx of which is a fingle leafed, turbinated, patent perianthium, cut into five, oval, permanent fegments: the corolla confifts of a fingle, patent, equal petal, of the length of the cup, and divided into five fegments; the fruit is a compreffed, orbiculated capfule, which is biventricofe, bivalvar, and bilocular, with a tranfverfe diffepiment: the feeds are but few in number, convex on one fide, and plain on the other.

SIBYLS, *fibyllæ*, in pagan antiquity, certain women faid to have been endowed with a prophetic fpirit, and to have delivered oracles, fore-fhowing the fates and revolutions of kingdoms, &c.

The moft eminent of the ten fibyls mentioned by antient writers, was fhe whom the Romans called the cumæan or erythræan fibyl, from her being born at Erythræ in Ionia, and removing from thence to Cumæ in Italy, where fhe delivered all her oracles from a cave, dug out of the main rock, according to Virgil, Æn. III. 441, &c.

There is ftill preferved, in eight books of greek verfes, a collection of verfes, pretended to have been delivered by the fibyls; but the generality of critics look upon it as fpurious: and it is the opinion of Prideaux, that the ftory of the three books of the fibyls, fold to Tarquin, was a ftate-trick or fetch of politics.

SICE-ACE, a game with dice and tables, whereat five may play; each having fix men, and the laft out lofing.

At this game, they load one another with aces; fixes bear away; and doublets drinks, and throws again.

SICHEM, or ZICHEM, a town of Brabant, eighteen miles eaft of Mechlin.

SICILIAN, in mufic, a kind of air or dance, in triple time, and played flow, notwithftanding it is marked the fame as a jigg.

SICILY, the largeft of all the italian iflands, antiently called Trinacria, from its triangular figure: it is fituated between 12° and 16° eaft longit. and between 37° and 39° north latitude: being about one hundred and feventy miles long, and one hundred broad.

It is feparated from Calabria, in Italy, by the ftreights of Meffina, which, in the narroweft part is not feven miles over.

SICKNESS, *Falling*-SICKNESS, *Green*-SICKNESS, &c. See the articles DISEASE, EPILEPSY, CHLOROSIS, &c.

SICUT ALIAS, in law, another writ iffued out like the former, where the firft was not executed.

SICYANIA, or GOURD-WORM, in natural hiftory, a genus of the apteria order of infects, being of an oblong form, flat on the belly, and rounded on the back; the fkin is foft; and the mouth large, horizontal, and emarginated, or dented in the middle. It grows to two thirds of an inch in length, though more ufually it is not half that fize; its breadth is nearly two thirds of its length. See the article APTERIA.

SICYOS, or SICYOIDES, in botany, a genus of the monoecia-fyngenefia clafs of plants, the corolla of which is formed of a fingle campanulated petal, divided into five fegments; and its fruit is a berry, containing only a fingle feed.

Dillenius calls this plant bryonoides.

SIDA, in botany, a genus of the monadelphia-polyandria clafs of plants, with a pentapetalous flower: the fruit is a roundifh

roundifh capfule, terminating in a point, and compofed of feveral horns, which finally feparating, tear the complex veffel to pieces; the feeds are roundifh and pointed, the one fide being convex, and the other of an angular figure.

This genus comprehends the malvinda and abutilon of authors. See the article ABUTILON.

SIDE, *latus*, the half of any thing, as an animal, a fhip, *&c.* The fides of an animal are diftinguifhed into the right and left fide; but thofe of a fhip, into the ftarboard and larboard fide. See the articles STARBOARD, *&c.*

In geometry, the fides of a rectilinear figure are the lines which form its periphery. See FIGURE and PERIPHERY.

SIDE *of a power*, the fame with its root. See the article ROOT.

SIDE-LAYS, among hunters, dogs that are let flip at a deer, as he paffes.

SIDES-MEN, or SYNOD'S MEN, perfons who, in large parifhes, are appointed to affift the church-wardens, in their enquiry and prefentments of fuch offenders to the ordinary, as are punifhable in the fpiritual court.

SIDEN, a port town of Arabia, fituated on the eaftern fhore of the Red fea, in eaft long. 42° 15', and north lat. 21° 20'.

SIDERATION, a term ufed for a fphacelus or mortification. See SPHACELUS. Some alfo ufe the term fideration for the blafting or blighting of trees. See the articles BLIGHT and TREE.

SIDEREAL YEAR. See the article YEAR.

SIDERIA, in natural hiftory, the name of a genus of cryftals, ufed to exprefs thofe altered in their figure by particles of iron. Thefe are of a rhomboidal form, and compofed only of fix planes. Of this genus there are four known fpecies: 1. A colourlefs, pellucid, and thin one, found in confiderable quantities among the iron ores of the foreft of Dean in Gloucefterfhire, and in other the like places. 2. A dull, thick, and brown one, not uncommon in the fame places with the former. And 3. a black and very gloffy kind, a foffil of very great beauty, found in the fame place with the others, as alfo in Leicefterfhire and Suffex. See the article CRYSTAL.

SIDERITES, in natural hiftory, the fame with the magnet. See MAGNET.

SIDERITIS, IRON-WORT, in botany, a genus of the didynamia-gymniofpermia clafs of plants, with a monopetalous, labiated, and ringent flower; the feeds are four in number, and contained in the cup, which ferves inftead of a capfule; add to this, that the flowers grow in circles round the ftalks, at the joinings of the leaves. See plate CCL. fig. 4.

SIDEROCHITA, in natural hiftory, a name which Dr. Hill gives to a clafs of foffils of a moderately firm and compact texture, and cruftated ftructure, compofed of a ferrugineous, mixed with earthy matter, and formed of repeated incruftations, making fo many coats or crufts round a fofter or harder nucleus; or round loofe earths, or an aqueous fluid. Of this clafs there are two orders, and under thefe four genera. The firft order is of thofe fiderochita which contain regular and folid nuclei, and comprehends the empherepyra, and the heteropyra. The fecond order is of thofe fiderochita, which contain no folid nucleus but loofe earthy matter, in form of powder, or an aqueous fluid, and comprehends the godes and the enhydrie. See the article EMPHEREPYRA, *&c.*

SIDEROXYLUM, in botany, a genus of the pentandria-monogynia clafs of plants, the flower of which confifts of a fingle petal, divided into five roundifh, erect, and concave fegments; the fruit is a roundifh berry, with two cells, in which are contained four feeds.

SIDMOUTH, a port-town of Devonfhire, fituated on a bay of the Englifh channel, ten miles fouth eaft of Exeter.

SIDON, or SAYD, a port-town of Paleftine, in afiatic Turky, feventy miles north of Jerufalem. It is ftill a place of fome confideration, being the refidence of a turkifh bafhaw.

SIDRA, an ifland of the Archipelago, fituated at the entrance of the gulph of Napoli.

SIEGE, in the art of war, the encampment of an army before a fortified place, with a defign to take it.

The method of encamping is very different in a fiege, from that obferved on a march; as in the former the army environs the place, without cannon-fhot, that nothing may enter. If the place be fituated on a river, a detachment is fent to the other fide, and bridges of communication made, both above and below the town. The army alfo encamp with their backs to the town, with the battalions and fquadrons interlined: and having taken poffeffion of all the heights, whence the enemy may be annoyed, the engineers trace the lines of circumvallation and contra-

contravallation; every regiment working at the place appointed them. See the articles CIRCUMVALLATION and CONTRAVALLATION.

When the general has difpofed his guards, as well towards the place as towards the country, and eftablifhed the lieutenant-generals to command in the particular quarters, he goes with the engineers to view the place, and orders the attack in the place judged the weakeft. See the article APPROACH.

To form a fiege, there muft be an army fufficient to furnifh five or fix reliefs for the trenches, pioneers, guards, &c. alfo artillery, and magazines furnifhed with a fufficient quantity of ammunition and provifions; and an hofpital, for taking care of the wounded.

To raife a fiege, is to give over attacking a place; ordering the works and pofts before it to be levelled.

SIEGEN, a city of Germany, thirty miles north of Naffau.

SIEGENBERG, a town of Weftphalia, fifteen miles fouth-eaft of Cologn.

SIENNA, a city of Italy, in the dutchy of Tufcany, fituated thirty-fix miles fouth of Florence.

SIERRA LEON, a river of Guinea, which falls into the Atlantic ocean, in weft long. 14°, and north lat. 7°.

SIEVE, or SEARCE, an inftrument ferving to feparate the fine from the coarfe parts of powders, liquors, and the like; or to cleanfe pulfe from duft, light grains, &c. It is made of a rim of wood, the circle or fpace whereof is filled with a plexus of filk, tiffany, hair, linen, wire, or even thin flices of wood. The fieves which have large holes are fometimes alfo called riddles, fuch as the coal or lime fieve; the garden-fieve, &c. When drugs are apt to evaporate, or to be paffed through the fieve, it is ufual to have it covered with a lid.

SIEUR, a title of refpect among the French, like *mafter* among us: it is much ufed by the lawyers, as alfo by fuperiors in their letters to inferiors.

SIGAN, a town of China, in the province of Xenfi: eaft longit. 108°, and north lat. 34°.

SIGESBECKIA, in botany, a plant of the fyngenefia-polygamia-fuperflua clafs, with a compound radiated flower, and tubulofe hermaphrodite corollulæ on the difc; the receptacle of the feeds is paleaceous, and they have no down.

SIGETH, a town of lower Hungary, fituated feventy-three miles fouth-weft of Buda, and fubject to the houfe of Auftria.

SIGHT, or VISION, in optics. See the article EYE and VISION.

SIGHTS *of a quadrant*, &c. thin pieces of brafs, raifed perpendicularly on its fide, or on the index of a theodolite, circumferentor, &c. They have each an aperture, or flit, up the middle, through which the vifual rays pafs to the eye, and diftant objects are feen. See the articles QUADRANT, THEODOLITE, &c.

SIGILLATA TERRA, a kind of bole, called alfo lemnian earth. See the articles BOLE and LEMNOS.

SIGILLUM, a SEAL. See SEAL.

SIGISTAN, the capital of a province of the fame name, in Perfia: eaft long. 62°, and north lat. 31°.

SIGN, *fignum*, in general, the mark or character of fomething abfent or invifible. See the article CHARACTER.

Among phyficians, the term fign denotes fome appearance in the human body, which ferves to indicate or point out the condition of the patient, with regard to health or difeafes. See INDICATION, DISEASE, &c.

SIGN, in algebra, denotes a fymbol or character. See the article CHARACTER.

Mr. Mac Laurin obferves, that the ufe of the negative fign, in algebra, is attended with feveral confequences that at firft fight are admitted with difficulty, and has fometimes given occafion to notions that feem to have no real foundation. This fign implies that the real value of the quantity reprefented by the letter to which it is prefixed, is to be fubftracted; and it ferves with the pofitive fign, to keep in view what elements or parts enter into the compofition of quantities, and in what manner, whether as increments, or decrements, (that is, whether by addition or fubftraction) which is, of the greateft ufe in this art. See the article POSITIVE.

In confequence of this, it ferves to exprefs a quantity of an oppofite quality to the pofitive, as a line in a contrary pofition; a motion with an oppofite direction; or a centrifugal force in oppofition to gravity; and thus often faves the trouble of diftinguifhing, and demonftrating feparately, the various cafes of proportions, and preferves their analogy in view. As the proportion of lines depends on their magnitude only, without regard to their pofition; and motions,

and

and forces, are ſaid to be equal, or unequal, in any given ratio, without regard to their directions: and, in general, the proportion of quantities relates to their magnitude only, without determining whether they are to be conſidered as increments or decrements; ſo there is no ground to imagine any other proportion of $-b$ and $+a$, (or of $-1$ and $1$) than that of the real magnitudes of the quantities repreſented by $b$ and $a$, whether theſe quantities are, in any particular caſe, to be added, or ſubſtracted. It is the ſame thing to ſubſtract a decrement as to add an equal increment, or to ſubſtract $-b$ from $a-b$, as to add $+b$ to it: and becauſe multiplying a quantity by a *negative* number implies only a repeated ſubſtraction of it, the multiplying $-b$ by $-n$, is ſubſtracting $-b$ as often as there are units in $n$; and is therefore equivalent to adding $+b$ ſo many times, or the ſame as adding $+nb$. But if we infer from this, that $1$ is to $-n$ as $-b$ to $nb$, according to the rule, that unit is to one of the factors as the other factor is to the product, there is no ground to imagine that there is any myſtery in this, or any other meaning than that the real magnitudes repreſented by $1$, $n$, $b$, and $nb$ are proportional. For that rule relates only to the magnitude of the factors and product, without determining whether any factor, or the product, is to be added, or ſubtracted. But this likewiſe muſt be determined in algebraic computations; and this is the proper uſe of the rules concerning the ſigns, without which the operation could not proceed. Becauſe a quantity to be ſubſtracted is never produced in compoſition, by any repeated addition of a poſitive, or repeated ſubſtraction of a negative, a negative ſquare-number is never produced by compoſition from the root. Hence $\sqrt{-1}$, or the ſquare root of a negative, implies an imaginary quantity; and, in reſolution, is a mark, or character of the impoſſible caſes of a problem, unleſs it is compenſated by another imaginary ſymbol, or ſuppoſition, when the whole expreſſion may have a real ſignification. Thus $1+\sqrt{-1}$, and $1-\sqrt{-1}$ taken ſeparately, are imaginary, but their ſum is $2$; as the conditions that ſeparately would render the ſolution of a problem impoſſible, in ſome caſes deſtroy each other's effect, when conjoined. In the purſuit of general concluſions, and of ſimple forms for repreſenting them, expreſſions of this kind muſt ſometimes ariſe where the imaginary ſymbol is compenſaed in a manner that is not always ſo obvious. See QUANTITY, POWER, &c.

By proper ſubſtitutions, however, the expreſſion may be transformed into another, wherein each particular term may have a real ſignification, as well as the whole expreſſion. The theorems that are ſometimes briefly diſcovered by the uſe of this ſymbol, may be demonſtrated without it, by the inverſe operation, or ſome other way; and though ſuch ſymbols are of ſome uſe in the computations by the method of fluxions, its evidence cannot be ſaid to depend upon arts of this kind.

SIGN, in aſtronomy, a conſtellation containing a twelfth part of the zodiac, or 30°. See the article ZODIAC.

The names of the ſigns, in the order wherein they follow each other, are aries, taurus, gemini, cancer, leo, virgo, libra, ſcorpio, ſagittarius, capricornus, aquarius, piſces. See the articles ARIES, TAURUS, GEMINI, &c.

The three firſt of theſe ſigns are called the vernal, or ſpring-ſigns; the next three, cancer, leo, virgo, the æſtival, or ſummer-ſigns; libra, ſcorpio, and ſagittarius, the autumnal ſigns; and capricornus, aquarius, piſces, the brumal, or winter-ſigns. The vernal and æſtival ſigns are alſo called the northern, and the autumnal and brumal the ſouthern ſigns.

SIGN-MANUAL, in law, is uſed to ſignify any bill, or writing, ſigned by the king's own hand.

SIGNALS, certain ſigns agreed upon, for ſuddenly conveying intelligence to places, to which the voice cannot reach. Thus, in ſome countries fires are lighted upon the hills, at the approach of danger: and at the beginning of a battle or an attack, ſignals are uſually made with drums and trumpets. At ſea they are given by firing cannon, or muſquets; by lights, flags, ſails, &c.

Signals at ſea are made by the admiral or commander in chief of a ſquadron, either in the day, or by night, whether for ſailing, fighting, or the better ſecurity of the merchant-ſhips under their convoy: theſe are very numerous and important, being all appointed and determined by the lords of the admiralty, and communicated in the inſtructions ſent to the commander of every ſhip of the fleet or ſquadron, before

before their putting to fea. Some of the principal of which are as follow: when a commander in chief would have them unmoor, he lofes his main-top-fail, and fires a gun, which, in the royal navy, is to be anfwered by every flag-fhip, and every fhip is to get under fail as foon as fhe can. When, in bad weather, he would have them wear, and bring to the other tack, he hoifts a pendant on the enfign-ftaff, and fires a gun: then the leward-moft and ftern-moft fhips are to wear firft, and bring on the other tack, and lie-by, or go on with an eafy fail, till he comes a head. When any fhip difcovers land, he is to hoift his jack and enfign, and keep it abroad till the admiral anfwer him by hoifting his, on fight of which he is to hawl down his enfign. If any difcovers danger, he is to tack and bear up from it, and to hang his jack abroad from the main-top-maft crofs-trees, and to fire two guns: but if he fhould ftrike or ftick faft, then, befides the fame fignal with his jack, he is to keep firing, till he fees all the fleet obferve him, and endeavour to avoid the danger. When the admiral would have the vice-admiral to fend out fhips to chace, he hoifts a flag ftriped white and red on the flag-ftaff at the fore-top-maft-head, and fires a gun: but if he would have the rear-admiral do fo, he hoifts the fame fignal on the flag-ftaff at the mizen-top-maft-head, and fires a gun. When he would have them give over chace, he hoifts a white flag on his flag-ftaff at the fore-top-maft head, and fires a gun; which fignal is alfo to be made by that flag-fhip which is neareft the fhip that gives chace, till the chacing fhip fees the fignal. When the admiral would have the fleet prepare to anchor, he hoifts an enfign ftriped red, blue, and white, on the enfign-ftaff; and fires a gun; and every flag-fhip makes the fame fignal.

Befides thefe, there are many other fignals ufed by day; and different fignals, upon thefe and other occafions, ufed by night: and others alfo when a fleet fails in a fog; all of which are to be found in the Book of Signals.

The fignals for managing a fea-fight are alfo very numerous, the principal of which are as follow: when the admiral would have the fleet form a line of battle, one fhip a-head of another, he hoifts an union-flag at the mizen-peek, and fires a gun; and every flag-fhip does the like. But when they are to form a line of battle one a-breaft of another, he hoifts a pendant with the union-flag, *&c.* When he would have the admiral of the white, or he that commands in the fecond poft, to tack, and endeavour to gain the wind of the enemy, he fpreads a white flag under the flag at the main-top-maft-head, and fires a gun: and when he would have the admiral of the blue do fo, he does the fame with the blue flag. If he would have the vice-admiral of the red do fo, he fpreads a red flag from the cap, on the main-top-maft-head downward on the back-ftay; if the vice admiral of the blue, he fpreads a blue flag, and fires a gun: if he would have the rear-admiral of the red do fo, he hoifts a red flag at the flag-ftaff at the mizen-top-maft-head; if the rear-admiral of the white, a white flag; if the rear admiral of the blue, a blue flag, and under it a pendant of the fame colour, with a gun. If he would have him that commands in the fecond poft of his fquadron, to make more fail, he hoifts a white flag on the enfign-ftaff; but if he that commands in the third poft be to do fo, he hoifts a blue flag, and fires a gun; and all the flag-fhips muft make the fame fignal. Whenever he hoifts a red flag on the flag-ftaff at the fore-top-maft-head, and fires a gun, every fhip in the fleet muft ufe their utmoft endeavour to engage the enemy in the order prefcribed. When he hoifts a white flag on his mizen-peek, and fires a gun, all the fmall frigates of his fquadron, that are not of the line of battle, are to come under the ftern. If the fleet be failing by a wind in the line of battle, and the admiral would have them brace their head fails to the maft, he hoifts up a yellow flag on the flag-ftaff at the mizen-top-maft-head, and fires a gun, which the flag-fhips are to anfwer, and then the fhips in the rear are to brace firft. After this, if he would have them fall their head-fails, and ftand on, he hoifts a yellow flag on the flag-ftaff of the fore-top-maft-head, and fires a gun, which the flag-fhip muft anfwer; and then the fhips in the van muft fall firft, and ftand on. If, when this fignal is made, the red-flag at the fore-top-maft-head be abroad, he fpreads the yellow flag under the red flag. If the fleets being near one another, the admiral would have all the fhips to tack together, the fooner to lie in a pofture to engage the enemy, he hoifts an union-flag on the flag-ftaves at the fore and mizen-top maft-heads, and fires a gun; and all the flag-fhips are to do

do the ſame. The fleet being in a line of battle, if he would have the ſhip that leads the van, hoiſt, lower, ſet, or hawl-up any of his ſails, he ſpreads a yellow flag under that at his main-top-maſt-head, and fires a gun; which ſignal the flag-ſhips are to anſwer: and the admiral will hoiſt, lower, ſet, or hawl-up the ſail, which he would have the ſhips that lead the van do; which is to be anſwered by the flag-ſhips of the fleet. When the enemies run, and he would have the whole fleet follow them, he makes all the ſail he can after them himſelf, takes down the ſignal for the line of battle, and fires two guns out of his fore-chaſe, which the flag-ſhips anſwer; and then every ſhip is to endeavour to come up with, and board the enemy. When he would have the chaſe given over, he hoiſts a white-flag at the fore-top-maſt-head, and fires a gun. If he would have the red ſquadron draw into a line of battle, one a-breaſt of another, he puts abroad a flag ſtriped red and white on the flag-ſtaff at the main-top-maſt-head, with a pendant under it, and fires a gun: if the white or ſecond ſquadron is to do ſo, the flag is ſtriped red, white, and blue: if the blue or third ſquadron is to do ſo, the flag is a genoeſe enſign and pendant: but if they are to draw into a line of battle one a-head of another, the ſame ſignals are made without a pendant. If they are to draw into the line of battle one a-ſtern of another, with a large wind, and he would have the leaders go with the ſtarboard-tacks aboard by the wind, he hoiſts a red and white flag at the mizen-peek, and fires a gun: but if they ſhould go by the larboard-tacks aboard the wind, he hoiſts a genoeſe flag at the ſame place: which ſignals, like others, muſt be anſwered by the flag-ſhips.

SIGNATURE, a ſigning of a perſon's name at the bottom of an act or deed, wrote by his own hand.

Signature *of the court of Rome*, is a ſupplication anſwered by the pope, whereby he grants a favour, diſpenſation or collation to a benefice, by putting the fiat to it with his own hand; or the conſenſum is written in his preſence. This ſignature at the bottom of the ſupplication, gives the name to the whole inſtrument.

Signature, in printing, is a letter put at the bottom of the firſt page at leaſt, in each ſheet, as a direction to the binder, in folding, gathering, and collating them. The ſignatures conſiſt of the capital letters of the alphabet, which change in every ſheet: if there be more ſheets than letters in the alphabet, to the capital letter is added a ſmall one of the ſame ſort, as A a, B b; which are repeated as often as neceſſary. In large volumes it is uſual to diſtinguiſh the number of alphabets after the firſt three or four, by placing a figure before the ſignature as 5 B, 6 B, &c.

Signature is alſo uſed, by ſome natualiſts, for the reſemblance a vegetable or mineral bears to a part of the human body; which, by ſome fantaſtical people, is ſuppoſed to indicate its virtues and uſe.

SIGNET, one of the king's ſeals, made uſe of in ſealing his private letters, and all grants that paſs by bill ſigned under his majeſty's hand: it is always in the cuſtody of the ſecretaries of ſtate. See the article Secretary.

SIGNIFICATION, in general, denotes the meaning of a ſign, word, phraſe, and the like.

In law, it is uſed for the notifying an act, &c, to the oppoſite party, by a copy thereof given and atteſted by the proper officer.

SIGNIFICAVIT, in law, a writ which iſſues out of the court of chancery, on a certificate given by the ordinary of a perſon's ſtanding excommunicated forty days, in order to have him impriſoned till he ſubmits to the authority of the church. See Excommunication.

SIGNING, in law. See Signature.

SIGUENCA, a city of old Caſtile, in Spain, ſixty miles north-eaſt of Madrid.

SILENE, small-flowered campion, in botany, a genus of the decandria-trigynia claſs of plants, the flower of which conſiſts of five petals; and its fruit is cylindraceous, divided into three or five cells, and containing numerous kidney-ſhaped ſeeds.

SILESIA, a dutchy belonging to the king of Pruſſia, two hundred miles long, and ſeventy broad: it is bounded by Brandenburgh on the north, by Poland on the eaſt, by Hungary on the ſouth, and by Moravia and Bohemia on the weſt.

SILESIAN-EARTH, *terra ſileſiaca*, in the materia medica, a fine aſtringent bole, called by ſome authors axungia ſolis. It is very heavy, of a firm compact texture, and in colour of a browniſh yellow. It breaks eaſily between the fingers and does not ſtain the hands, is naturally

naturally of a smooth surface, and is readily diffusible in water, and melts freely into a butter-like substance in the mouth. It leaves no grittiness between the teeth, and does not ferment with acid menstrua. These are the characters by which it is known from all other earths of a like colour. It is found in the perpendicular fissures of rocks near the gold-mines at Strigonium in Hungary, and is supposed to be impregnated with the sulphur of that metal. It is, however that be, a good astringent, and better than most of the boles in use.

Montanus gives us a high character of its virtues, and says, it is gold transmuted by nature into an admirable medicine. Senertus commends it as excellent against malignant fevers, diarrhœas, &c. Agricola tells us, that the spirit of this earth dissolves gold, as well as aqua regia, though more slowly, into a red solution; which, in a few days, precipitates the gold in fine powder. He also mentions another earth found at Westerwald, preferable to this Silesian earth.

SILEX, the *flint*, in natural history. See the article FLINT.

SILIQUA, a term used by botanists to denote a pod. See the article POD.

SILIQUA is also a name given to the ceratonia. See the article CERATONIA.

SILIQUOSE PLANTS, those which produce pods, and are otherwise called leguminous. See the article LEGUME.

SILISTRIA, a city of european Turky, in the province of Bulgaria, ninety miles east of Nissa: east long. 25°, north lat. 42° 40′.

SILK, *sericum*, in natural history, is properly an animal fluid, hardened by the air; being an extremely soft and glossy thread, spun by the bombyx or silk-worm, the body of which consists of eleven rings: it produces a species of phalenæ or moths, with pectinated wings, but no tongue. See PHALENA.

The humours, found in the body of this insect, approach to the nature or silk; since, on being rubbed in the hand, they leave a solid crust behind. In the sides of the belly, all about the ventricle, there are deposited a vast number of vessels, which contain the silky juice; these run with various windings and meanders to the mouth, and are so disposed, that the creatures can discharge their contents at pleasure at the mouth; and according to the nature of the juices, that they are supplied with, furnish different sorts of silk from them, all the fluid contents of these vessels hardening in the air into that sort of thread, that we find the web, or balls of this creature consist of.

As soon as the sik-worm is arrived at the size and strength necessary for beginning his cod, he makes his web; for it is thus they call that slight tissue, which is the beginning and ground of this admirable work. This is his first day's employment. On the second, he forms his folliculus or ball, and covers himself almost over with silk. The third day he is quite hid, and the following days employs himself in thickening and strengthening his ball, always working from one single end, which he never breaks by his own fault, and which is so fine, and so long, that those who have examined it attentively, think they speak within compass, when they affirm, that each ball contains silk enough to reach the length of six english miles.

In ten days time the ball is in its perfection, and is now to be taken down from the branches of the mulberry-tree, where the worms have hung it. But this point requires a deal of attention; for there are some worms more lazy than others, and it is very dangerous waiting till they make themselves a passage, which usually happens about the fifteenth day of the month.

The first, finest, and strongest balls are kept for the grain, the rest are carefully wound; or if it is desired to keep them all, or if there be more than can be well wound at once, they lay them for some time in an oven moderately hot, or else expose them, for several days successively, to the greatest heats of the sun, in order to kill the insect, which, without this precaution, would not fail to open itself a way to go and use those new wings abroad, it has acquired within.

Ordinarily, they only wind the more perfect balls; those that are double, or too weak, or too coarse, are laid aside, not as altogether useless, but that, being improper for winding, they are reserved to be drawn out into skains. The balls are of different colours; the most common are yellow, orange-colour, isabella, and flesh-colour; there are some also of a sea-green, others of a sulphur-colour, and others white; but there is no necessity for separating the colours and

shades to wind them apart, as all the colours are to be lost in the future scouring and preparing of the silk.

In the Philosophical Transactions, n° 252, we find the following observations concerning the goodness of silk, which is best distinguished by its lightness. The organcine silk is the best of any made in the country of Piedmont, and two threads are equal in fineness, that is in smoothness, thickness, and length, for the thread of the first twist. For the second, it matters not whether the single thread be strong before the two are joined, unless to see whether the first twist prove well. It is necessary that the silk be clean; and it is to be observed, that the straw-coloured is generally the lightest, and the white the heaviest of all. The skains should be even, and all of an equality, which shews that they were wrought together; otherwise we may with justice suspect that it is refuse silk, and cannot be equally drawn out and spun, for one thread will be shorter than the other, which is labour and loss.

It will also be requisite to search the bale more than once, and take from out of the parcels a skain to make an essay; for unless it be known by trial what one buys, there is the greatest danger of being cheated in this commodity. To make an estimate, and know the lightness, fix the essay upon one eighth of a portée, or hand of silk of a hundred and ten aunes or ells of Lyons in length, and see what it makes of aunes by the eighth part. The skain, which is of eighty threads, must be multiplied by a hundred and ten aunes of Lyons, and from this number must be deducted one eighth; as for example, 110 by 80 makes 8800, the eighth part of which is 1100; and this is the eighth part of a portée, or hand of silk. Now to calculate what these 1100 aunes weigh, which is the eighth part of a portée, or of 110 aunes of Lyons, it will be proper to take a skain out of the parcels, which you take from out of the bale which you judge may contain, at least, 1100 aunes, to make the one eighth part of a portée, which portée must be divided on two bobbings, half on each; then fix the two bobbings on the center, or beam, and from thence pass it through the comb hurdissoir, *viz.* 550 from the two bobbings, will make 1100, which will be one eighth part of what you desire to know. This done, you cut off your silk, and carry it to put on the hurdissoir; then weigh it, and multiply the weight by eight, it will weigh just as much as a portée of 110 aunes of Lyons, which is the general rule for calculating. When they draw the silk out by this means, one may learn to adjust the weight.

There are silks of Piedmont, which are very light and clean, and are to be preferred before any on the sale: the portée of silk of the lightest weighs near twenty-four penny-weights, and from this it arises in gravity to twenty-five, and twenty-six penny-weights the portée, and sometimes to twenty-seven and twenty-eight; but even these weights may be dispensed with, provided that the other qualities be good, that is, that it be well wrought, even and clean. When the silk is more than twenty-eight penny-weights the portée, it must always be proportionably cheaper.

*Methods of preparing* Silks. The several preparations which silks undergo to fit them to be used in the manufacture of silken stuffs, are reeling, spinning, milling, bleaching, and dyeing. To wind silks from off the balls, two machines are necessary; the one a furnace, with its copper; the other a reel, or frame, to draw the silk. The winder, then seated near the furnace, throws into the copper of water over the furnace (first heated and boiled to a certain degree, which custom alone can teach) a handful or two of balls, which have been first well purged of all their loose furry substance. She then stirs the whole very briskly about with birchen rods, bound and cut like brushes; and when the heat and agitation have detached the ends of the silks of the pods, which are apt to catch on the rods, she draws them forth, and joining ten or twelve, or even fourteen of them together, she forms them into threads, according to the bigness required to the works they are destined for: eight ends sufficing for ribbands; and velvets, &c. requiring no less than fourteen. The ends, thus joined into two or three threads, are first passed into the holes of three iron-rods, in the fore-part of the reel, then upon the bobbings, or pullies, and at last are drawn out to the reel itself, and there fastened; each to an end of an arm or branch of the reel. Thus disposed, the winder, giving motion to the reel, by turning the handle, guides the threads; substitutes new ones, when any of them break, or any of the balls are wound out; strengthens them, where necessary,

neceſſary, by adding others; and takes away the balls wound out, or that, having been pierced, are full of water. See plate CCXLIX.

In this manner, two perſons will ſpin and reel three pounds of ſilk in a day; which is done with greater diſpatch than is made by the ſpinning-wheel or diſtaff. Indeed, all ſilks cannot be ſpun and reeled after this manner; either by reaſon the balls have been perforated by the ſilk-worms themſelves, or becauſe they are double, or too weak to bear the water; or becauſe they are coarſe, &c. Of all theſe together, they make a particular kind of ſilk, called floretta; which being carded, or even ſpun on the diſtaff, or the wheel, in the condition it comes from the ball, makes a tolerable ſilk.

As to the balls, after opening them with ſciſſars, and taking out the inſects (which are of ſome uſe for the feeding of poultry) they are ſteeped three or four days in troughs, the water whereof is changed every day to prevent their ſtinking. When they are well ſoftened by this ſcouring, and cleared of that gummy matter the worm had lined the inſide withal, and which renders it impenetrable to the water, and even to air itſelf, they boil them half an hour in a lye of aſhes, very clear and well ſtrained: and after waſhing them out in the river, and drying them in the ſun, they card and ſpin them on the wheel, &c. and thus make another kind of floretta, ſomewhat inferior to the former.

As to the ſpinning and reeling of raw ſilks off the balls, ſuch as they are brought from Italy and the Levant, the firſt is chiefly performed on the ſpinning-wheel; and the latter, either on hand-reels, or on reels mounted on machines, which ſerve to reel ſeveral ſkains at the ſame time. See the article REEL.

As to the milling, they uſe a mill compoſed of ſeveral pieces, which may mill two or three hundred bobbins at once, and make them into as many ſkains.

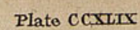
For the dyeing of ſilks. See DYEING.

SILK, in medicine, is very little uſed for medicinal purpoſes; though if the bags were burnt in a cloſe veſſel, in the ſame manner as ſponge, they would undoubtedly prove a medicine of ſimilar, and probably of ſuperior virtue: they yield a larger quantity of volatile ſalt, than any other animal ſubſtance we know of; and the ſpirit of raw ſilk, rectified with ſome eſſential oil, makes the medicine known by the name of engliſh drops. See the article DROPS.

*Spider* SILK, that prepared of the webs of ſpiders; which, according to Reaumur, is inferor to that obtained from the bags of the ſilk-worm, both in ſtrength and luſtre.

*Duties upon* SILKS. Raw long ſilks of all ſorts, except from Bengal, pay, on importation, a duty of 1 s. $11\frac{10}{100}$ d. the pound, containing twenty-four ounces; and draw back on exportation, 1 s. $8\frac{25}{100}$ d. Bengal raw-ſilk pays, on importation, 2 s. $4\frac{72\frac{1}{2}}{100}$ d. the pound of twenty-four ounces; and draws back, on exportation, 2 s. $1\frac{87\frac{1}{2}}{100}$ d. Raw ſhort ſilk pays, on importation, only 1 s. $3\frac{40}{100}$ d. the pound of twenty-four ounces; and draws back, on exportation, 1 s. $1\frac{1}{2}$ d. Sattin-ſilk pays, on importation, by the pound of ſixteen ounces, 7 s. $8\frac{40}{100}$ d. and draws back, on exportation, 6 s. 9 d. But raw ſilks, imported directly from any of the britiſh american plantations, and of the growth of the ſame, pay no duty at all. Thrown ſilk, dyed, pays, on importation, by the pound of ſixteen ounces, a duty of 19 s. 3 d. and, on being exported, draws back 16 s. $10\frac{50}{100}$ d. As to manufactured or wrought ſilks, french alamodes or luſtrings, pay, on importation, by the pound of ſixteen ounces, 2 l. 15 s. $10\frac{32}{100}$ d. but if not french, only 1 l. 15 s. $10\frac{32}{100}$ d. Indian wrought ſilks, imported in britiſh ſhipping, and duly entered at the port of London, pay only $4\frac{72\frac{1}{2}}{100}$ d. the pound of ſixteen ounces. Wrought ſilks of the manufacture of Italy, imported in britiſh ſhips, pay 12 s. $1\frac{55}{100}$ d. the pound of ſixteen ounces; and draw back, on exportation, 11 s. $7\frac{21\frac{2}{3}}{100}$ d. All french wrought ſilks, except alamodes and luſtrings, pay, on importation, only 1 l. 7 s. $11\frac{16}{100}$ d. the like pound; and draw back, on exportation, 17 s. $3\frac{56}{100}$ d. Wrought ſilks, except alamodes and luſtrings, from any part of the world, pay, on importation, only 14 s. $2\frac{16}{100}$ d. the like pound; and draw back, on exportation, 13 s. $6\frac{56}{100}$ d. Flowered ſilks, or thoſe mixed with gold or ſilver, except of India, Perſia, or China, pay, on importation, 1 l. 1 s. $6\frac{40\frac{1}{2}}{100}$ d. the

like




T. Jefferys sculp

like pound; and draw back, on exportation, 19s. $10\frac{45\frac{1}{2}}{100}$d.

SILLON, in fortification, the fame with envelope. See ENVELOPE.

SILPHIUM, in botany, a genus of the fyngenefia-polygamia-neceffaria clafs of plants, the general corolla whereof is radiated with a great number of hermaphrodite flofcules in the difc, and with a fewer number of the female ones in the radius: the partial corolla of the hermaphrodite is monopetalous, infundibuliform, and quinquedentated; there is no pericarpium; the female feed is folitary, membranaceous, and obverfely cordated.

SILVER, *argentum*, ☽, in natural hiftory, the pureft and moft fixed of all metals, except gold, for the fpecific gravity of which, fee the article GRAVITY.

Silver, though frequently found native and pure, is however often found in the ftate of ore; as among the grey ores of copper, the ore of lead, of cobalt, antimony, and other mineral bodies. The proper and peculiar ores of filver are of various appearances; as in that of a foft fubftance of a blackifh blue colour, greatly refembling lead: another ore of filver is in form of brown or brownifh-yellow obfcurely tranfparent maffes, not a little refembling the coarfer forts of amber: there is another filver-ore of a very bright and beautiful red, a fmooth even furface, and confiderably pellucid, refembling very much native fandarach These are the more ufual and determinate ores of filver, which in many of the german mines are blended all together, fometimes with the black kind wholly covering the red: the black kind is often foft enough to be cut with a knife.

The method of precipitating filver out of an eafily fufible ore is this: pound the ore very fine in an iron-mortar, and for an affay weigh one docimaftical centner of it, and eight centners of granulated lead; pour into a new teft about half the lead, ftir it about with a finger, and fpread it over the cavity of the teft; put upon this lead the pounded ore, and then cover it with the remainder of the lead; put the teft, thus loaded, under the muffle of an affay-furnace, and in the hinder part of it make the fire, and encreafe it to a confiderably high degree. The ore will foon be raifed out of the melted lead, and fwim upon it; a little after it will grow clammy, melt, and be thrown toward the border of the teft; then the furface of the lead will appear clear in the middle of the teft, and will fmoak and boil; the fire muft now be made a little lefs, till the boiling ceafes, for a quarter of an hour, and then made violent again, and the furface of the lead will then diminifh by degrees, and be covered with a mafs of fcoriæ. At this time have at hand an iron hook ready heated, and with this ftir all the matter from the fides into the middle of the teft; if the matter, adhering to the hook from the ftirring, melts quickly again, and the extremity of the hook, when cold, is found covered with a fhining cruft, the fcorification is perfected; but if the fcoriæ feel clammy while ftirred, and adhere in quantity to the hook, and are of a rough furface, the fcorification is not perfect, but the matter adhering to the hook muft be ftruck off with a hammer, and beat to powder, and returned into the teft, and the fire continued till the fcorification is perfected; then take out the teft, and pour the whole contents into a mould, heated and greafed. This is the firft procefs, and this ufually takes up three quarters of an hour: the filver is now in form of a regulus, and muft be feparated by the coppel in the ufual way. See the article COPPELLING.

When filver-ores are rendered refractory by an admixture of mundic, they muft be pounded and put into a covered teft, which is to be placed in an affay-furnace under a muffle, till all the mundic is evaporated; which you may know by the ceffation of the fmoke from the ore: let this roafted ore cool leifurely; then powder it fine, and mix it with an equal quantity of glafs of lead reduced likewife to fine powder; and, laftly, fcorify the whole till the filver appear in the form of a bright bead in the middle of the teft.

When the filver is well purified, fo that all heterogenous matter, either metallic or other, that might be mixed with it, is extracted, they fay it is twelve carats fine. This is the expreffion they ufe to denote the quality of the pureft filver, without any mixture or alloy; but, if there fhould remain any, they deduct the weight of the mixture from the principal weight, and the remainder fhews the value of the filver. The carat confifts of twenty-four grains: fo that, when to the weight of twelve carats there are twelve grains of mixture, the value of the filver is eleven carats twelve grains; and fo of any other.

Silver,

Silver, though confiderably hard in comparifon of lead or gold, is yet malleable and ductile to a very great degree, and may be drawn out into an extremely fine wire. It is lefs capable of ruft than any other metal, except gold; but it readily becomes black on being rubbed with fulphur. It requires a middle degree of fire to fufe it; bearing unaltered a ftronger degree of heat than either lead or gold, but melting much more eafily than copper or iron. It, indeed, grows red-hot, but then melts immediately. It amalgamates readily enough with mercury; the readieft way of mixing them is to have the filver in fine filings, very clear from greafe, and to rub it in a mortar with the mercury. It is fixed in a common fire, fo as to lofe fcarce any thing; and perhaps, truly fpeaking, not any thing at all, in the fierceft degree of it, if never fo long continued: it has been tried by Boerhaave for two months together, in the eye of a glafs-houfe-furnace and found to lofe only one twelfth part of its weight in the operation; and it is highly probable, that even this lofs might be owing to the filver's not being perfectly purified at firft.

Silver, expofed to the fierceft fire, collected in the focus of a large burning-glafs, immediately becomes red-hot, and melts; it then crackles, and afterwards emits a thick fmoak: foon after this, it is covered with a dufty fubftance, or calx. If the filver have been refined by means of antimony, the calx is of a yellowifh hue, and, if kept long enough in the focus, it will vitrify in the fame manner as gold; but, if it have been refined with lead, the calx is whiter, and, Homberg affures us, will never vitrify, however long expofed, even to that degree of heat.

Silver is purified by means of lead, and bears its action without lofs. Fufed with antimony, if the effect be not carefully prevented, it turns to fcoria, and becomes volatile: there is no metal, indeed, except gold alone, that bears the teft with this rapacious mineral, in the common way. See the article Gold.

The proper folvent of filver is aqua fortis; it is diffolved readily by this, and not at all by the common aqua regia; yet, under certain circumftances, aqua regia will diffolve filver: the firft phlegm which arifes in diftilling that menftruum, when newly made, and when it has been fome time in digeftion with gold, will diffolve filver, and will not touch gold; though it cannot but be acknowledged, this liquor is as much aqua regia, as what follows in the diftillation. This, however, is an experiment of mere curiofity, not likely ever to occur in the way of bufinefs, and in that refpect, though we are acquainted with this accident, which was difcovered by Homberg, we may fay in general, that aqua fortis diffolves filver, and not gold; and aqua regia diffolves gold, and not filver. If but the fmalleft quantity of fea-falt be put into aqua fortis, it will no longer give a clear folution of filver. This gives us a teft for the goodnefs of aqua fortis: and to this difference in the effect of thefe two menftrua we owe the only method of feparating filver from gold, without lofs. If filver be fufed with lead, it lofes its found, and its bright colour; if melted with tin, it becomes extremely brittle, and the two metals are very difficultly feparated again. It melts and mixes eafily with copper, and by that means acquires a hardnefs which fits it for our coins and utenfils, much better than in its pure natural ftate. See the article Assaying.

Silver, melted with arfenic (which is eafily done by mixing the arfenic with a little chalk and a little tartar, then wetting it with common water, and then ftratifying the filver with the mafs) receives a part of that fubftance into its own body, and fhews the fingular effect it has on it, in its lofing all its malleability; but the arfenic may be feparated from it again by only melting it in a ftrong fire.

Silver, melted with bifmuth, is afterwards much the more eafily amalgamated with quickfilver; and what is yet more remarkable, is, that it by this means becomes fo attenuated, that it will pafs through a leather in much larger quantity mixed with the mercury, than it would otherwife have done. It is made much more fufible, as well as volatile, by antimony, and is ftrangely debafed by the fume of burning fulphur. Silver is faid by fome to be able to colour the natural gems, and factitious glaffes, and paftes with a fine blue; but this is an error wholly owing to the alloy of copper, which is in moft filver, and which has occafionally fhewn this effect in the artificial products of this kind. But though filver is not capable of communi-

municating any colour to foffils, it has, however, a power of influencing their figure, and that in a very fingular manner: it has long been known, that iron determines the cryftals it enters the compofition of, into rhombs, and lead into cubes; but it has not been known that thefe truncated cryftals and fpars, preferved as great curiofities in the cabinets of the curious, owe their figure to filver, till filver was lately feparated from them. As certainly, therefore, as iron or lead can form cryftal into cubes and rhombs, fo certainly can filver, even in a very fmall quantity, influence the figure of thofe foffils, and form them into columns truncated at each end.

If filver be melted with common falt, it blends with proper management into a femipellucid mafs, called luna cornea; which is very difficultly reduced into filver again, as being fo volatile as to fly wholly off in a fmall degree of heat.

The chemifts, who fuppofe filver to have fome peculiar affinity to the moon, therefore call it luna: their character for it is ☽; by which they mean to denote the half of gold, whofe character is a complete circle; the inner line of this figure, if turned outward, would make it the complete mark of gold.

*Refining of* SILVER. See REFINING.

*Medicinal virtues and preparations of* SILVER. The chemifts have faid great things of the virtues of filver, and, accordingly, have endeavoured to introduce a long train of lunar medicines; fuch as argentum potabile, diaphoreticum lunare, bezoardicum lunare, and fifty others as pompous as infignificant: the only preparations of filver, which keep up their credit in the fhops, are the lunar cryftals and cauftics. See the articles CRYSTAL and CAUSTIC.

As to the pretended tinctures of filver, being only tinctures of copper, they are by no means fafe internally; and every coloured tincture of filver may be boldly declared to be of this kind.

The only preparation, therefore, we fhall add, is, that liquor kept by many as a mighty fecret for tinging hair of any colour to a fine black. It is thus prepared: take three drams of crude mercury, and diffolve it in an ounce and half of aqua fortis; add to this, two ounces of the folution of filver in aquafortis, and pour the whole into a veffel of clean water, fo much in quantity, that the liquor may not be able to corrode copper, nor raife bubbles on its furface; and when it has ftood a month, it may be ufed with fafety. See the article MERCURY.

SILVER-LEAF, that beaten out into fine leaves for the ufe of the gilders, which is performed in the fame manner as gold-leaf. See the article GOLD-LEAF.

SILVER-WIRE, that drawn out into fine wire; for the manner of doing which, fee the article GOLD-WIRE.

*Shell*-SILVER, is prepared of the fhreads of filver-leaves, or of the leaves themfelves, for the ufe of painters, after the fame manner as fhell-gold. See GOLD.

SILVER-TREE, *eugenia*, in botany, a fmall but beautiful tree of Jamaica, belonging to the icofandria-monogynia clafs of plants; its leaves are fmooth, very thin, and grow in pairs; the flowers are fmall and whitifh, and grow at the alæ of the leaves. See the article EUGENIA.

SILVERING, the covering of any thing with filver. It is ufual to filver metals, wood, paper, *&c.* which is performed either with fire, oil, or fize. Metal-gilders filver by the fire; painter-gilders all the other ways. See GILDING.

To filver copper or brafs: 1. Cleanfe the metal with aquafortis, by wafhing it lightly, and immediately throwing it into fair water; or by heating it red hot, and fcouring it with falt and tartar, and fair water, with a fmall wire-brufh. 2. Diffolve fome filver in aquafortis, in a broad-bottomed glafs veffel, or of glazed earth, then evaporate away the aquafortis over a chaffing-difh of coals. 3. Put five or fix times its quantity of water, or as much as will be neceffary to diffolve it perfectly, on the remaining dry calx; evaporate this water with the like heat; then put more frefh water, and evaporate again; and if need be, the third time, making the fire towards the latter end fo ftrong, as to leave the calx perfectly dry, which, if your filver is good, will be of a pure white. 4. Take of this calx, common-falt, cryftal of tartar, of each a like quantity, or bulk, and mixing well the whole compofition, put the metal into fair water, and take of the faid powder with your wet fingers, and rub it well on, till you find every little cavity of the metal fufficiently filvered over. 5. If you would have it richly done, you muft rub on more of the powder, and in the laft place wafh the filvered metal in fair water, and rub it hard with a dry cloth.



SILVER-

SILVERING *of glasses*. See the article FOLIATING *of looking-glasses*.

SIMATIUM, or SIMAISE, in architecture. See the article CYMATIUM.

SIMEREN, a city of Germany, in the palatinate of the Rhine: east long. 7° 5′, north lat. 50°.

SIMIA, the MONKEY, in zoology, a genus of quadrupeds, of the order of the anthropomorpha, the characters of which are, that the face is naked, the claws rounded and flattish in some degree, like the nails on the human hand, and there is an eye-lid each way. See the articles MONKEY and ANTHROPOMORPHA.

This genus, among several other species, comprehends the satyr, the baboon, and the rat-ape. See SATYR and BABOON.

SIMILAR, in arithmetic and geometry, the same with like. Those things are said to be similar or like, which cannot be distinguished but by their compresence, that is, either by immediately applying the one to the other, or some other third to them both, so that there is nothing found in one of the similar things but is equally found in the other, notwithstanding their similitude may differ in quantity; and since in similar things there is nothing wherein they differ besides the quantity, quantity itself is the internal difference of similar things. In mathematics, similar parts have the same ratio to their wholes, and if the wholes have the same ratio to the parts, the parts are similar. See PART. Similar angles are also equal angles. In solid angles, when the planes under which they are contained are equal, both in number and magnitude, and are disposed in the same order, they are similar, and consequently equal. Similar arches of a circle are such as are like parts of their whole circumferences, and consequently equal. Similar plane numbers are those numbers which may be ranged into the form of similar rectangles, that is, into rectangles whose sides are proportional; such are 12 and 48, for the sides of 12 are 6 and 2, and the sides of 48 are 12 and 4; but 6 : 2 : : 12 : 4, and therefore those numbers are similar. Similar polygons are such as have their angles severally equal, and the sides about those angles proportional. Similar rectangles are those which have their sides about the equal angles proportional; hence, 1. All squares are similar rectangles. 2. All similar rectangles are to each other as the squares of their homologous sides. Similar right-lined figures are such as have equal angles, and the sides about those equal angles proportional. Similar segments of a circle are such as contain equal angles. Similar curves: two segments of two curves are called similar, if, any right lined figure being inscribed within one of them, we can inscribe always a similar right lined figure in the other. Similar conic sections: two conic sections are said to be similar when any segment being taken in the one, we can assign always a similar segment in the other. Similar diameters of two conic sections: the diameters in two conic sections are said to be similar, when they make the same angles with their ordinates. Similar solids are such as are contained under equal numbers of similar planes alike situated. Similar triangles are such as have their three angles respectively equal to one another. Hence, 1. All similar triangles have the sides about their angles proportional. 2. All similar triangles are to one another as the squares of their homologous sides. See the articles ANGLE, ARCH, NUMBER, POLYGON, &c.

SIMILAR BODIES, in natural philosophy, are such as have their particles of the same kind and nature with one another. See BODY, PARTICLE, &c.

SIMILAR DISEASE, in medicine, denotes a disease of some simple, solid part of the body; as of a fibre with regard to its tension or flaccidity; of a membrane; a nervous canal, or the like. See DISEASE.

SIMILAR FIGURES, in geometry, such as have their angles respectively equal, and the sides, about the equal angles, proportional. See the articles RECTANGLE, TRIANGLE, and POLYGON.

SIMILAR PARTS, in anatomy, are those parts of the body which at first sight appear to consist of like parts, or parts of the same nature, texture, and formation; of these we usually reckon ten, *viz.* the bones, cartilages, ligaments, membranes, fibres, nerves, arteries, veins, flesh, and skin. See BONE, CARTILAGE, &c.

SIMILE, or SIMILITUDE, in rhetoric, a comparison of two things, which though different in other respects, yet agree in some one. The difference between a simile and comparison, is said to consist in this, that the simile properly belongs to whatever we call the quality of the thing, and the comparison to the quantity. See the article COMPARISON.

SIMILITUDE, in arithmetic, geometry, &c.

&c. denotes the relation of two things similar to each other. See SIMILAR.

SIMONICAL is applied to any person guilty of simony. See SIMONY.

SIMONIANS, in church history, a sect of antient heretics, so called from their founder, Simon Magus, or the magician. The heresies of Simon Magus were principally his pretending to be the great power of God, and thinking that the gifts of the Holy Ghost were venal, and to be purchased with money. He is said to have invented the Æons, which were so many persons of whom the Godhead was composed. His concubine Helen, he called the first intelligence, and mother of all things; and sometimes he called her Minerva, and himself Jupiter. Simon Magus gained a great many proselytes, who paid himself and his concubine divine worship; these were the earliest heretics, and those that St. John, St. Peter and St. Paul, in their epistles, so often warn the christians against.

SIMONY, in ecclesiastical law, the crime of buying or selling spiritual gifts or preferments. In the antient christian church, this crime was always thought to be committed when men either offered or received money for ordinations. The apostolical canons lay a double punishment both of deposition and excommunication, on such of the clergy as were found guilty of it. This was the first sort of simony, and that which was most properly so called, and to this the antients reduced the exacting of any reward for administring the eucharist or baptism, or for any spiritual offices. A second sort of simony consisted in buying the spiritual preferments of the church; this was punished with deposition in any bishop, who promoted any church-officer for the sake of lucre; and the persons so promoted, were to be degraded from their office. By the laws of Justinian, every elector was to depose upon oath, that he did not chuse the person elected for any gift or promise, or friendship, or any other cause, but only because he knew him to be a man of the true catholic faith, of unblamable life, and good learning. This last sort of simony was, when men by ambitious arts and undue practices, got themselves invested in an office or preferment to which they had no regular call, or when they intruded themselves into other mens places, which were legally filled before. The casuists for the Church of Rome maintain, that all compacts or bargains in which benefices are concerned, are simonical, when it is done without the pope's concurrence; but that, once obtained, gives a sanction to the thing, which they found upon this universal proposition, that the pope cannot commit simony in beneficiary matters, since he hath a power so absolute over all the ecclesiastical goods and benefices, that he can unite, divide, and bestow them in whatever manner he pleases.

Against the corruption of simony, there have been many canons made in our own church, which punishes the offender with deprivation, disability, &c. and by a statute of the 31 Eliz. it is enacted, that if any person for any sum of money, reward, gift, profit, or benefit, or by reason of any promise, agreement, grant, bond, covenant, or other assurance, shall present, or collate any person to any benefice with cure, dignity, or living ecclesiastical, every such presentation, or collation, and every admission or induction thereupon, shall be utterly void, and the crown shall present for that turn; and the person that shall give or take any sum of money, &c. shall forfeit double the value of one year's profit of any such benefice; and the person so corruptly taking any such benefice, shall from thenceforth be disabled to have and enjoy the same.

SIMPLE, *simplex*, something not mixed or compounded, in which sense it stands opposed to compound. See the article COMPOUND.

Thus we say, simple form, simple mode, simple fee, simple force, simple equation, simple anomaly, simple glands, simple vision, simple flank, simple fraction, &c. See the articles FORM, MODE, FEE, FORCE, EQUATION, &c.

SIMPLE, in pharmacy, a general name given to all herbs or plants, as having each its particular virtue, whereby it becomes a simple remedy.

SIMPLE, in music, is chiefly used in opposition to double, sometimes to a compound of several parts or figures of different values, &c. Simple cadence is that where the notes are equal in every part. Simple concords are those wherein we hear at least two notes in consonance, as a third and fifth, and of consequence at least three parts, which is either done immediately, and called the harmonical triad, or in a more remote manner; that is, when the sounds which are not bass, are

are one or two octaves higher. This diſtance has no bad effect in the third; but in the fifth it has, and generally ſpeaking, the nearer or more immediate the concords are, the better. They alſo ſay, C ſimple, or plain, in oppoſition to C accented. Simple counter-point is a harmonical compoſition, wherein note is ſet againſt note, in oppoſition to figurative counter-point. Simple fugue, or ſimple imitation, is where one part imitates the ſinging of another for ſome meaſures. See the articles COUNTER-POINT, IMITATION, FUGUE, &c.

For ſimple interval, and ſimple triple, ſee the articles INTERVAL and TRIPLE.

SIMPLEX BENEFICIUM, ſignifies an inferior dignity in a cathedral, or collegiate church, a ſine-cure, penſion, or any eccleſiaſtical benefice, oppoſed to a cure of ſouls, and which therefore is conſiſtent with any parochial cure, without coming under the denomination of pluralities.

SIMPLIFYING, in eccleſiaſtical matters, is the taking away the cure of ſouls from a benefice, and diſpenſing the beneficiary from reſidence. Several benefices which have been ſimplifyed, now require reſidence, and a great number of others, which required reſidence, have been ſimplifyed: ſome uſe this word in a more extenſive ſignification, *viz.* for the ſhortening a relation, &c. or retrenching every thing not preciſely neceſſary.

SIMPLUDIARIA, in antiquity, a kind of funeral honours paid to the deceaſed at their obſequies.

SIMUL-CUM, in law, words that formerly were made uſe of in indictments and declarations of treſpaſs, where there were ſeveral defendants, ſome whereof were known, and others not.

SIN, a breach or tranſgreſſion of ſome divine law, or command.

SINAI, a mountain of Arabia Petrea, ſituated eaſt long. 35°, north lat. 29°, and memorable on account of the laws being given to the Jews on this mount.

SINAI, *knights of.* See CATHARINE.

SINAPI, or SINAPIS, *muſtard*, in botany, a genus of the tetradynamia ſiliquoſa claſs of plants, the corolla whereof conſiſts of four cruciform, roundiſh, plane, patent, and intire petals, with erect linear ungues, and ſcarcely the length of the cup; the fruit is an oblong, rough pod, conſiſting of two valves, and containing two cells; the ſeeds are numerous and globoſe.

Muſtard-ſeed is an attenuant and reſolvent in a very high degree; it warms the ſtomach, and excites an appetite; but its principal medicinal uſe is external in ſinapiſms, applications made to certain parts when irritation is intended, but not bliſtering. It is uſually mixed with horſe-radiſh root, and other ingredients of the ſame kind, for this purpoſe.

SINAPISM, in pharmacy, an external medicine, in form of a cataplaſm, compoſed chiefly of muſtard-ſeed pulverized, and mixed with the pulp of figs, or with briony, garlic, onion, or the like. See the preceding article.

SINCIPUT, in anatomy, the fore-part of the head, reaching from the forehead to the coronal ſuture. See the articles HEAD and SKULL.

SINCOPORA, a promontory of Malacca in the Eaſt Indies, ſituated in 2° north lat. oppoſite to the iſland of Sumatra, with which this cape forms the ſtraits, called the Straits of Sincopora.

SINDON, in ſurgery, a little round piece of linen ſilk, or lint, uſed in dreſſing a wound after trepanning. See the article TREPANNING.

SINE, or *right* SINE *of an arch*, in trigonometry, is a right line drawn from one end of that arch, perpendicular to the radius drawn to the other end of the arch; being always equal to half the chord of twice the arch. Thus, SR (plate CCL. fig. 6.) is the right ſine of the arches SA and SD.

The radius, CB, is called the whole ſine, or the ſine of 90°. The ſine-complement, or co ſine, of an arch AS, is the part CR, intercepted between the center and right ſine; ſo called, as being always equal to SH, the ſine of the complement of that arch to 90°, *viz.* SR. And the verſed ſine of an arch, AS, is the part, RA, intercepted between the right ſine, SR, and the extremity of the arch, A. For the uſe of ſines in trigonometrical calculations, ſee the articles TRIGONOMETRY, NAVIGATION, &c.

SINE ASSENSU CAPITALI, in law, a writ lying where a biſhop, dean, prebendary, or maſter of an hoſpital, aliens the lands held in right of his biſhopric, deanery, &c. without the conſent of the chapter, or fraternity; in which caſe his ſucceſſor ſhall have this writ, and ſometimes he may enter upon ſuch alienation, and need not bring it.

SINE-CURES, eccleſiaſtical benefices without cure of ſouls. No church, where there is but one incumbent, can properly be

be a fine-cure: and though the church being down, or the parish being become destitute of parishioners, the incumbent may be thereby necessarily acquitted from the actual performance of public duty; yet he is still under an obligation to do it whenever a church shall be built, and there are a competent number of inhabitants: and in the mean time, if the church be presentative, as most such churches are, the incumbent is instituted into the cure of souls; such benefices are rather depopulations than fine-cures, and it will be proper for the new incumbent to read the thirty-nine articles, and the liturgy in the church-yard, &c. and to do whatever other incumbents usually do. But a rectory, or portion of it, may properly be a fine-cure, if there be a vicar under the rector, endowed and charged with the cure, in which case it does not come within the statute of pluralities, 21 H. VIII. *c.* 13. Here therefore, no dispensation is necessary to hold the fine-cure with a former living, nor need the incumbent read the articles, or divine service, as required by 13 Eliz. *c.* 12. which extends only to a benefice with cure. By the above-mentioned statute of Hen. VIII. not only prebends and rectories, with vicarages endowed, but deaneries, and arch-deaneries are declared to be benefices without cure.

SINE DIE, *without day*, in law, a term frequently used in our proceedings at common law; as when judgment is given against the plaintiff, he is said to be in *misericordia pro falso clamore suo*; so when judgment passes for the defendant, it is entered *eat inde sine die*, being as much as to say, he is discharged, or dismissed the court.

SINEW, denotes what we properly call a nerve, though in common speech, it is rather used for a tendon. See the articles NERVES and TENDONS.

SINGING, the action of making divers inflexions of the voice, agreeable to the ear, and correspondent to the notes of a song, or piece of melody. See MELODY. The first thing to be done in learning to sing, is to raise a scale of notes by tones and semi-tones to an octave, and descend by the same notes; and then to rise and fall by greater intervals, as a third, fourth, fifth, &c. and to do all this by notes of different pitch. Then these notes are represented by lines and spaces, to which the syllables *fa, so, la, mi*, are applied, and the pupil taught to name each line and space thereby; whence this practice is called *sol-faing*, the nature, reason, effects, &c. whereof, see under the article SOLFAING.

SINGULAR NUMBER, in grammar, that number of nouns and verbs which stands opposed to plural; and is used when we only speak of a single, or one, person, or thing. See PLURAL and NUMBER. The Latins, French, English, &c. have no numbers but the singular and plural; but the Greeks and Hebrews have likewise a dual number, peculiar to two persons. See LATIN, FRENCH, &c.

SINGULTUS, the HICKUP, in medicine. See the article HICKUP.

SINICAL QUADRANT. See QUADRANT.

SINISTER, something on, or towards, the left-hand; sinister is also used, among us, for unlucky, though in the sacred rites of divination, the Romans frequently used it in an opposite sense.

SINISTER, in heraldry. The sinister side of an escutcheon is the left hand side; the sinister chief, the left angle of the chief; the sinister base, the left hand part of the base. See ESCUTCHEON, &c.

SINISTER ASPECT, among astrologers, is an appearance of two planets happening according to the succession of the signs, as Saturn in aries, and Mars in the same degree of gemini.

SINISTRI, a sect of antient heretics, thus called, because they held the left hand in abhorrence, and made it a point of religion not to receive any thing therewith.

SINKING FUND, a provision made by parliament, consisting of the surplusage of other funds, intended to be appropriated to the payment of the national debts; on the credit of which very large sums have been borrowed for public uses.

SINNET, on board a ship, a line or string made of rope-yarn, consisting generally of two, six, or nine strings, which are divided into three parts, and are platted over one another, and then beaten smooth and flat with a wooden mallet. Its use is to save the ropes, or to keep them from galling.

SI NON OMNES, in law, the name of a writ on association of justices, by which, if all in commission cannot meet at the day assigned, it is allowed that two or more of them may proceed to finish the business.

SINOPE, a port-town of asiatic Turky, situated on the Euxine Sea: east long. 36° 25′, north lat. 42° 25′.

SINOPICA *terra*, in natural hiftory, the name of a red earth of the ochre-kind, called alfo rubrica finopica, and by fome authors finopis. It is a very clofe, compact, and weighty earth, of a fine glowing purple colour, but in fome fpecimens much deeper than in others, and in fome degenerating into palenefs; but even in its worft condition, it is a very fine colour. It is of a pure texture, but not very hard, and of an even, but dufty furface. It adheres firmly to the tongue, is perfectly fine and fmooth to the touch, does not crumble eafily between the fingers, and ftains the hands. It melts very flowly in the mouth, and is perfectly pure and fine, and of a very auftere aftringent tafte, and ferments very violently with aqua fortis. It was dug in Cappadocia, and carried for fale to the city Sinope, whence it had its name. It is now found in plenty in the New Jerfeys in America, and is called by the people there blood ftone, from its ftaining the hands to a blood-colour, and may probably be had in many other places; and this deferves thoroughly enquiring into, fince there feems not one among the earths more worthy notice. Its fine texture and body, with its high florid colour, muft make it very valuable to painters, and its powerful aftringency equally fo in medicine. The antients were well acquainted with it in fluxes and hæmorrhages, and experience fhews it poffeffes the fame virtues at this time. The deepeft coloured is ever the moft aftringent.

SINOPLE, or SENOPLE, in heraldry, denotes vert, or the green colour in armories. See the article VERT.

Sinople is ufed to fignify love, youth, beauty, rejoicing, and liberty, whence it is, that letters of grace, abolition, legitimation, &c. are always ufed to be fealed with green wax.

SINUATED LEAF, in botany, a leaf which has a number of finufes on its fide, but thofe feparated by lobes, not very long, nor themfelves indented, or notched at the edges. *Sinuato-dentated* leaf, expreffes a leaf like the former, but with the lateral lobes of a linear figure.

SINUOSITY, a feries of bends and turns in arches, or other irregular figures, fometimes jutting out, and fometimes falling in.

SINUOUS ULCERS. See ULCER.

SINUS, in anatomy, denotes a cavity of certain bones, and other parts, the entrance whereof is narrow, and the bottom wider and more fpacious. Of thefe finufes we find feveral in divers parts of the body, particularly in the internal furfaces of the os occipitis; in adults, there is a crofs, to which adheres the finufes and proceffes of the dura mater, the ufe whereof is to carry the blood from the brain, by a very peculiar mechanifm, under the fella equina, or turcica of the os fphenoides; there is alfo a finus called the fphenoidal finus; this is fometimes double, and opens into the noftrils; fometimes it is totally wanting. See the articles SKULL, BRAIN, SPHENOIDES OS, DURA MATER, &c.

For the finufes of the larynx and vena portæ, fee LARYNX and PORTA.

Sinus of an artery is ufed, by fome, for any part of an artery where its fides are ftretched out beyond the ordinary proportional dimenfions elfewhere. Morgagni has obferved four fuch finufes in the aorta, three of them anfwering to the femilunar valves; and the fourth is all that part of the aorta between the former finufes, and the origin of the common trunk of the right fubclavian and carotid arteries. Sinus of the womb is ufed for any cavity within its fubftance. See the article UTERUS.

SINUS, in furgery, a little cavity, or facculus, frequently formed by a wound or ulcer, wherein pus is collected. See the article WOUND, &c.

A finus is properly a cavity in the middle of a flefhy part, formed by the ftagnation and putrefaction of the blood or humours, and which has wrought itfelf fome vent or exit. See the article FISTULA.

SION, a town of Switzerland, in the county of Valais, fituated on the river Rhone, twenty-three miles fouth-eaft of the lake of Geneva, being a fovereign ftate.

SION-COLLEGE. See COLLEGE.

SIPHON, or SYPHON, in hydraulics, a bended pipe, one end of which being put into a veffel of liquor, and the other hanging out of the faid veffel over another, the liquor will run out from the firft into the laft, after the air has been fucked out of the external or lower end of the fiphon, and that as long as the liquor in the upper veffel is above the upper orifice of the fiphon. Thus, H D S (plate CCL. fig. 1. n° 1.) is a fiphon whofe two parts H D, D S, are called its legs, and by its operation, the water is drawn out of the upper veffel ABCD, into

into the lower *ab*. When you have fucked out the air at S, the water follows, coming in at H, going in the direction H G D S, and out at S, as long as the furface E F is above I H; the level of the mouth of what is called the driving leg of the fiphon, being that in which the water goes up, as that through which it goes down is called the iffuing leg, and is always longer than the driving leg. Now, the caufe of the fiphon's running is this. The air which preffes into the veffel A B C D, reprefented by the column K L, fuftains the column of water L D, in the fhort leg of the fiphon, preffing againft that air with its perpendicular height D F, whilft the column of air MS, preffing upwards againft the hole of the long or iffuing leg D S (which acts according to the height D C) muft yield and fuffer the water to run out as long as the leg D S is longer, or rather higher in perpendicular than D G. For fince K and M are fuppofed at top of the atmofphere, the column K L and M S are equal in height and preffure, (the height of L above S being of no account in the height of the atmofphere) as long as M S is acted upon by the defcending water D S, whofe height is from D to S (fuppofe fifteen inches) an height fuperior to that of the column D G (fuppofe of feven inches) fupported by the column of air K L, the column M S muft yield to the water iffuing out at S; and however the furface of the water E F defcends, the column K L, by its preffure, will always overcome the refiftance of the column M S, becaufe it has a lefs height of water to fuftain than M S has. If the mouth of the iffuing leg had been at T, the water would hang in equilibrio, filling both legs of the fiphon, when the water is come down in the upper veffel to I H T, becaufe then the two columns of air K L and M S will be acted againft by an equal weight of water in the legs of the fiphon; but if then you raife the iffuing end of the fiphon, now fuppofed at T, up to the level of *u* V above I H, the water will run back up from V to D, and fo out at H, in the upper veffel, becaufe then the column M S having only the height V D to fuftain, will be acted againft with lefs force than the column K L, which is preffed againft by the whole height D H, fuperior to V D. See the articles FLUID, ENGINE, AIR, &c.

Since the preffure of the air is the caufe of the water being pufhed up into the fiphon, and the difference of its preffure (as one column is acted againft by the water in the fhort leg more weakly than another column of air is acted upon by the water in the long leg) is the caufe of its running continually from one veffel into another, when once fet agoing, it follows, that the bend D of the upper part of the fiphon muft not be above thirty-two feet higher than the water in the upper veffel, becaufe the air cannot fuftain a column of water, whofe height exceeds thirty-two feet. If therefore there was a crane, or fiphon A C E D B (*ibid.* n° 2.) of about forty feet high, reckoning from A to E, with cocks A and B at its lower ends, and an hole at the top E, to be ftopped with a cork upon occafion, there might be made the following experiment; water being poured into the veffels A and B, let the cocks A and B be fhut, then with a funnel, pouring in water at E, till both legs of the fiphon are full, ftop the hole E, and open the two cocks at once. The water, inftead of running from the veffel A into B, which it would do if the height C A was much under thirty-two feet, will in the two legs fall back to C and D thirty-two feet above A and B, where it will hang, the air not being able to fuftain the water above thofe heights, and confequently to drive it up over the bend E. Nay, unlefs the water be purged of air before the experiment, the top of the water at C and D will not be quite thirty feet above the water in the veffels A and B, becaufe air will extricate itfelf out of the water, and getting into the cavity C E D, prefs a little on the top of the water at C and D, fo that its height will be lefs to balance the preffure of the atmofphere. See the article ATMOSPHERE.

Mercury will run in a fiphon in the fame manner as water, but then the bend of the fiphon muft not be more than thirty inches and eight tenths above the ftagnant mercury in the upper veffel; becaufe, as it is near fourteen times fpecifically heavier than water, it will be lifted up by the preffure of the air but the fourteenth part that water is lifted.

To prove further, that a different preffure againft the orifices of the unequal legs of a fiphon, is the caufe of a liquor running through that inftrument from a higher into a lower veffel, we may make ufe of any other fluid, lighter than the fluid to be brought over, inftead of air, and leave the bend of the fiphon open to the air, as

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in the following experiment: ABCD, (*ibid.* n° 3.) is a pretty large glafs jar with a little water (tinged red to make the experiment the more confpicuous) in its bottom, to the height of an inch, as at EF. On a ftand between F and G in the great jar, there is placed a little jar, GHKI, almoft full of the faid red water: let down the fiphon SLMG, open at S, M, and G, into the veffel, fo that the end S of the long leg ftands in the water at the bottom of the great jar; and G, the end of the fhort leg in the little jar, at the bottom of its water; pour in oil of turpentine into the great jar up to L, fo that the water in the little jar may alfo be covered with it, and the water will firft rife up in both legs of the fiphon, fo as to meet at the bend L, then it will run out of the little jar into the great one through the fiphon, in the direction GHLS, as long as there is any water in the little jar above G. See the article BAROMETER.

Inftead of hanging a fiphon over the fide of a veffel, it may be adapted to a cup; fo that the fhort leg being in the cup, the long leg may go down through the bottom of the cup; and then it is called Tantalus's cup. See the article TANTALUS'S CUP.

There are fome fiphons through which the water will run out of a veffel without fucking the air from them, or making them in the manner of a wafte pipe: but thefe muft be made of capillary tubes whofe bore muft not be bigger than one tenth of an inch; and as foon as they are put into a veffel of water TsS (*ibid.* n° 4.) they will begin to run, and fo continue as long as there is any water above the driving leg. This happens becaufe the attraction of cohefion, which makes water rife up in fmall tubes, draws the furface V to W in the fiphon; where being lower than the furface of the water in the veffel, it muft run down; becaufe the column of water WS, is longer or higher than the column SV; and the air pufhing down at V, muft overcome the refiftance of the air pufhing upwards at S. For the fame reafon, a piece of lift of cloth, AD, will make the water come out of the veffel and fall down in drops at E; as this piece of cloth is in effect a bundle of capillary fiphons made by its interftices. But if the furface of the water in the veffel was at *gh*, the fiphon being put in the water, would not run out, but only rife in the fiphon up to *ef*, the height to which a tube of that bore would raife the water by the attraction of cohefion. Whenever the veffel is full, this experiment will fucceed in vacuo. See COHESION, CAPILLARY, &c.

SIPHONANTHUS, or SIPHONANTHEMUM, a genus of the tetrandria-monogynia clafs of plants, the corolla whereof confifts of a fingle funnel-fhaped petal: the fruit confifts of four roundifh berries within a patulous cup: the feed is folitary and roundifh.

SIRADIA, a city of great Poland, in the palatinate of that name, fituated on the river Warta: eaft longitude 18°, north latitude 52°.

SIRANAGER, a city of hither India, capital of the province of Siba, fituated on the river Ganges: eaft longitude 80°, north latitude 31° 30′.

SIRE, a title of honour in France, now given to the king only, as a mark of fovereignty. In all placets and petitions, epiftles, difcourfes, &c. to the king, he is addreffed under the title of fire.

Sire was antiently ufed in the fame fenfe with fieur and feigneur, and applied to barons, gentlemen, and citizens.

SIREN, σειρην, in antiquity, a kind of fabulous animal, otherwife called a mermaid. See the article MERMAID.

The firens are reprefented by Ovid, &c. as fea monfters, with women's faces and fifhes tails; and by others decked with plumage of various colours. The three firens are fuppofed to be the three daughters of the river Achelous, and are called Parthenope, Ligea, and Leucofia. Homer makes mention of only two firens, and fome others reckon five. Virgil places them on rocks where veffels are in danger of fpliting. Some reprefent them as fuch charming monfters, who fung fo harmonioufly, that failors were wrecked on their rocks without regret, and even expired in raptures.

SIRIK, or SERQUES, a town of Lorrain, fituated on the Mofelle, twelve miles fouth-eaft of Luxemburg.

SIRIUS, the DOG-STAR, in aftronomy, a very bright ftar of the firft magnitude, in the mouth of the conftellation canis major. See CANICULA and CANIS.

SIRMIUM, a city of Sclavonia, fituated on the eaft fide of the river Save: eaft long. 20°, north lat. 45°.

SIRNAME. See the article SURNAME.

SISKIN, in ornithology, a fpecies of the fringilla, with a fpotted breaft, of the bignefs of the green-finch: the head is large

large and round: the iris of the eyes is hazel: the beak ſhort, conic and robuſt: the head black: the back tinged with green: the belly white, and wings elegantly variegated with a tranſverſe ſtreak of yellow. See plate CCL. fi. 2.

SISON, CORN-PARSLEY, or BISHOP'S-WEED, in botany, a genus of the pentandria-digynia claſs of plants, the general corolla whereof is uniform: the partial corolla is formed of five equal lanceolated inflex petals: there is no pericarpium: the naked fruit is oval, ſtriated, and ſeparable into two parts: the ſeeds are two, oval, convex, ſtriated on one ſide, and plane and ſmooth on the other. The ſeed of this plant is one of the four leſſer hot ſeeds of the ſhops, and is an attenuant, aperient and carminative. It is preſcribed in flatulencies and colics, and againſt obſtructions of the menſes; and is ſaid alſo to be a lithontriptic.

SISTERON, a city of France, in the province of Provence, ſituated on the river Durance: eaſt longitude 5° 45′, north latitude 44° 16′.

SISTRUM, or CISTRUM, a kind of antient muſical inſtrument, uſed by the prieſts of Iſis and Oſiris. It is deſcribed by Spon as of an oval form, in manner of a racket, with three ſticks traverſing it breadth-wiſe, which playing freely by the agitation of the whole inſtrument, yielded a kind of ſound which to them ſeemed melodious. Mr. Malcolm takes the ſiſtrum to be no better than a kind of rattle. Oiſelius obſerves, that the ſiſtrum is found repreſented on ſeveral medals and on taliſmans.

SISYMBRIUM, WATER-CRESS, in botany, a genus of the tetradynamia-ſiliquoſa claſs of plants, the corolla whereof conſiſts of four cruciform, oblong, erecto-patent petals, oftentimes leſs than the cup, with a great number of ungues: the fruit is a long, crooked, cylindrical pod, conſiſting of two valves, and containing two cells: the ſeeds are numerous and ſmall. See plate CCL. fig. 5. The young leaves of this plant are frequently eaten in ſpring as a ſallad: the whole plant is of an acid taſte, and is a powerful attenuant and reſolvent. It is recommended as a kind of ſpecific in the ſcurvy, and is eaten in large quantities for that intention with great ſucceſs. It is good againſt obſtructions of the viſcera, and conſequently in jaundices, and many of the chronic diſeaſes. It is alſo a powerful diuretic, and promoter of the menſes: the beſt way of uſing it is in manner of a ſallad, or by drinking the expreſſed juice, which is at preſent much a cuſtom with us in ſpring with that of brook-lime, &c.

SISYRINCHIUM, in botany, a genus of the gynandria-triandria claſs of plants, the corolla whereof conſiſts of ſix oblong erecto-patent plane petals, rounded vertically with a point. The fruit is a triquetrous capſule, rounded vertically, conſiſting of three cells, and containing three valves: the ſeeds are numerous and roundiſh.

SITE, or SCITE, *ſitus*, denotes the ſituation of an houſe, meſſuage, &c. and ſometimes the ground-plot, or ſpot of earth it ſtands on.

In logic, ſitus is one of the predicaments declaring a ſubject to be ſo and ſo placed: and in geometry and algebra, it denotes the ſituation of lines, ſurfaces, &c.

SITOPHYLAX, in grecian antiquity, an athenian magiſtrate, who had the ſuperintendance of the corn, and was to take care that nobody bought more than was neceſſary for the proviſion of his family. By the attic laws, particular perſons were prohibited buying more than fifty φορμαι, or meaſures of wheat a man; and the ſitophylax was to look to the obſervation of this law. It was a capital crime to prevaricate in it. There were fifteen of theſe officers, ten for the city and five for the pyræus.

SITTA, the NUTHATCH, in ornithology, the name of a diſtinct genus of birds, uſually confounded with the picæ. The beak of the ſitta is of a conic and ſomewhat cultrated form: the tongue is lacerated and emarginated: the feathers of the tail are rigid. The ſitta is of the ſize of our common goldfinch: the head is ſmall and depreſſed: the beak is ſhort, black on the upper part and white on the lower towards the throat: the head, neck, back, and wings, are grey: the breaſt of a pale yellow; and the lower part of the belly ſomewhat reddiſh. See plate CCL. fig. 3.

SIUM, WATER-PARSNEP, SKIRRET, and NINZIN, in botany, a genus of pentandria-digynia claſs of plants, the general corolla whereof is uniform: the partial one conſiſts of five inflex equal petals: the fruit is naked, and of an oval or roundiſh figure, ſmall, ſtriated, and ſeparable into two parts: the ſeeds are two,

two, roundish, striated, and convex on the one side, and plane on the other.

The leaves of this plant, eaten either crude or boiled, are said to break and expel the stone; to excite urine and the menses; to promote the expulsion of the fœtus, and to be good in a dysentery.

SIXAIN, SIXTH, *sexagena*, in war, an antient order of battle, wherein six battalions being ranged in one line, the second and fifth were made to advance, to form the van-guard; the first and sixth to retire, to form the rear-guard; the third and fourth remaining on the spot, to form the corps, or body, of the battle.

SIX-CLERKS. See *Six* CLERKS.

SIXTH, *sexta*, in music, one of the simple original concords, or harmonical intervals. See the article CONCORD.

The sixth is of two kinds, greater and less, and therefore is esteemed one of the imperfect concords, though each of them arise from a different division of the octave: the greater sixth is a concord resulting from the mixture of the sounds of two strings, that are to each other as 3 : 5 : the less from those of two strings, in the ratio of 5 : 8. See SCALE.

The less sixth is composed diatonically of six degrees, whence its name, and five intervals, three whereof are tones, and two semi-tones; chromatically of eight semi-tones, five whereof are greater, and three less: it has its form, or origin, from the *ratio super tri-partiens quinta*.

The greater sixth is diatonically composed, like the other, of six degrees and five intervals, among which four are tones and one semi-tone; chromatically, of nine semi-tones, five whereof are greater, and four less; consequently, it hath a less semi-tone more than the former. It has its origin from the *ratio super bi-partiens tertia*. See PROPORTION.

Antiently the sixth had only one duplicate, which was the thirteenth; but in the modern system of music it has the twentieth for its triplicate, the twenty-seventh for its quadruplicate, &c. every one of which are indifferently marked in thorough bass by the figure 6. And even the sixth itself both greater and less, when natural, is not expressed any otherwise, than by a simple 6: but when it is greater or less, by accident, the characters of sharp or flat are set along with the 6.

Besides these two kinds of sixths, which are both good concords, there are two others that are vicious and dissonant; the first, called the defective sixth, composed of two tones and three semi-tones, or of seven semi-tones, five of which are greater, and two less; the second is the redundant sixth, composed of four tones, a greater semi-tone and a less; whence some call it pentatonon, as comprehending five tones. These two, being both dissonant, should never be used in melody, and very rarely in harmony.

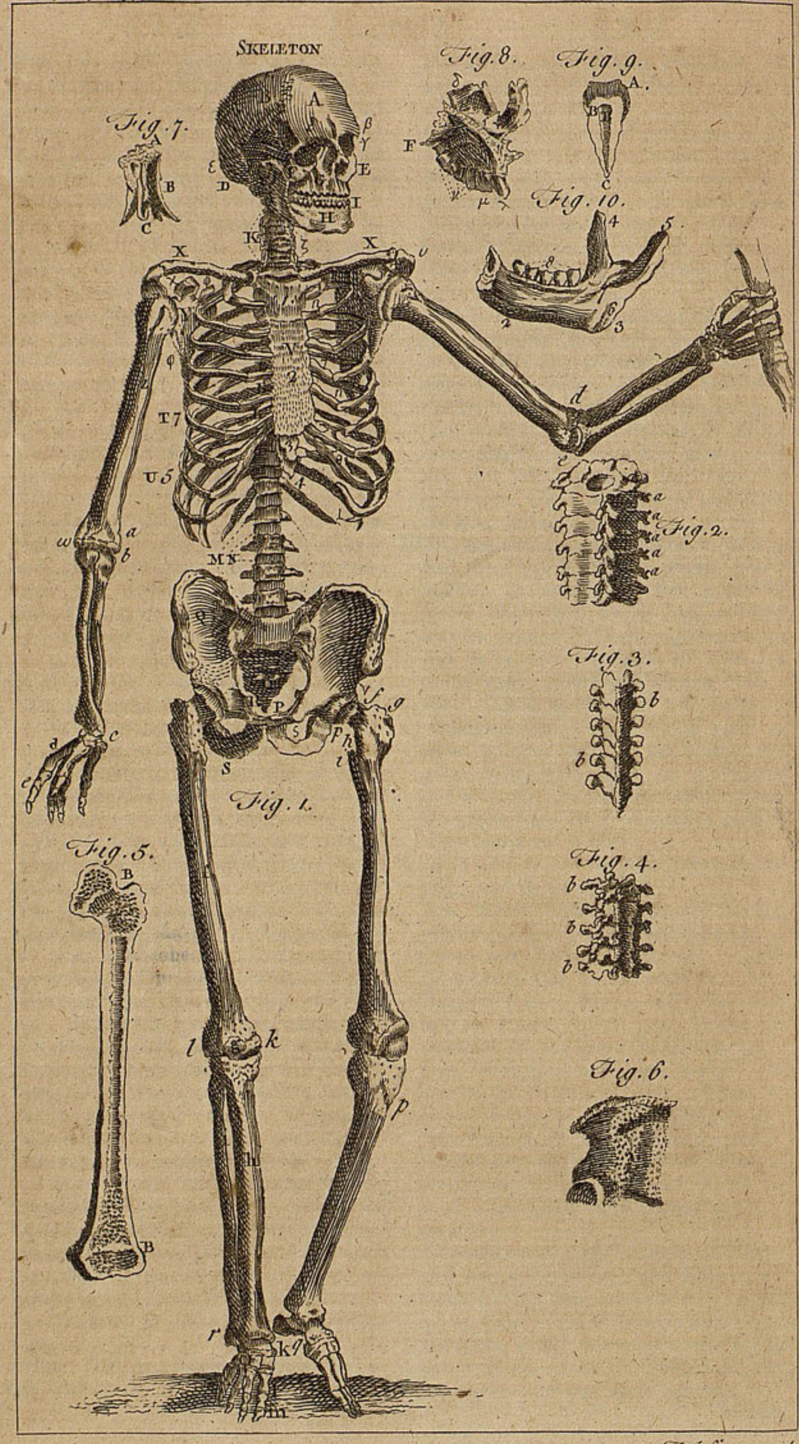
As to the two consonant sixths, they were antiently used very sparingly: at present they are allowed to be used as often as one pleases, as is the case with thirds; the sixths being in reality no other than inverted thirds: but care is usually taken that the first sixth that occurs be a less, the last a greater; and from the greater we rise to the octave; and from the less, fall to the fifth.

SIZE, the name of an instrument used to find the bigness of fine round pearls withal. It consists of thin pieces or leaves, about two inches long and half an inch broad, fastened together at one end by a rivet In each of these are round holes drilled of different diameters. Those in the first leaf serve for measuring pearls from half a grain to seven grains; those of the second, for pearls from eight grains, or two carats, to five carats, &c. and those of the third, for pearls from six carats and a half to eight carats and a half.

SIZE is also a sort of paint, varnish, or glue, used by painters, &c.

The shreds and parings of leather, parchment, or vellum, being boiled in water and strained, make size. This substance is used in many trades. Mr. Boyle mentions, among other uses, that fine red stands and hanging shelves are coloured with ground vermillion tempered with size, and when dry are laid over with common varnish. There is also a size made of ising-glass, in the same manner, and for the like purposes; but this size will not keep above three or four days, so that no more should be made of it at once than present occasion requires.

The manner of using size is to melt some of it over a gentle fire, and scraping as much whiting into it as may only colour it, let them be well incorporated together; after which you may whiten frames, &c. with it. After it dries, melt the size again, and put more whiting, and whiten




T. Jefferys sculp

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whiten the frames, &c. feven or eight times, letting it dry between each time: but before it is quite dry, between each wafhing, you muft fmooth and wet it over with a clean brufh-pencil in fair water.

To make gold-fize take gum animi and afphaltum, of each one ounce; minium, litharge of gold, and umber, of each half an ounce; reduce all into a very fine powder, and add to them four ounces of linfeed-oil, and eight ounces of drying-oil; digeft them over a gentle fire that does not flame, fo that the mixture may only fimmer, but not boil; for fear it fhould run over and fet the houfe a-fire, keep it conftantly ftirring with a ftick till all the ingredients are diffolved and incorporated, and do not leave off ftirring it till it becomes thick and ropy; and being boiled enough, let it ftand till it is almoft cold, and then ftrain it through a coarfe linen-cloth and keep it for ufe.

To prepare it for working, put what quantity you may have occafion to ufe in a horfe-mufcle fhell, adding fo much oil of turpentine as will diffolve it, and making it as thin as the bottom of your feed lac varnifh, hold it over a candle, and then ftrain it through a linen-rag into another fhell; add to thefe fo much vermilion as will make it of a darkifh-red: if it is too thick for drawing, you may thin it with fome oil of turpentine. The chief ufe of this fize is for laying on metals.

The beft gold-fize for burnifhing is made as follows: take fine bole, what quantity you pleafe, grind it finely on a marble, then fcrape into it a little beef-fuet; grind all well together; after which mix a fmall proportion of parchment-fize with a double proportion of water, and it is done.

To make filver-fize: take tobacco-pipe clay, in fine powder, into which fcrape fome black-lead and a little Genoa-foap, and grind them all altogether with parchment-fize, as already directed.

SIZYGY, or SYZYGY. See SYZYGY.

SKAITE, in ichthyology, the variegated raia, with the middle of the back fmooth, and one row of fpines on the tail. See the article RAIA.

This is one of the largeft of the raia, growing to more than a yard in length, and its breadth equal to about three fourths of its length, and its thicknefs fo confiderable that it often weighs a hundred pounds: the back is fomewhat gibbofe: the belly more flat: the colour is a pale grey, variegated with irregular fpots of black: the roftrum is long and fub-acute: the eyes are large and prominent: there are two apertures, one behind each eye: the mouth is large and tranfverfe: the gills are fmall, and run in two feries, five in each, down the breaft: the lateral fins of the male fifh have a great number of little fpines on them, both on the upper and under fides: thefe are not found in the female.

SKELETON, σκελετον, in anatomy, an affemblage or arrangement of all the bones of a dead animal, dried, cleanfed, and difpofed in their natural fituation, and kept in that order by means of wires, &c.

The fkeleton of the human body being of great ufe in learning its ofteology, we have given a figure of it in plate CCLI. where fig. 1. is the entire fkeleton of a man; A, the frontal bone; B, the parietal bone; C, the temporal bone; D, the occipital bone; E, the bones of the nofe; F, the os malarum; G, the fuperior maxillary bone; H, the lower jaw; I, the teeth; K, the feven vertebræ of the neck, with their cartilages between them; L, L, L, &c. the twelve vertebræ of the back; M, the five vertebræ of the loins; N, the cartilages between the vertebræ of the loins; O, the os facrum; P, the os coccygis; Q, the os ilium; R, the os pubis; S, the os ifchium; T, the feven true ribs; U, the five falfe ribs; V, the fternum; X, X, the clavicles; Y, the fcapula; Z, the humerus, or arm-bone; a, the ulna; b, the radius; c, the carpus; d, the metacarpus; e, the phalanges digitorum; f, the thigh-bone, g, the rotula; h, the tibia; i, the fibula; k, the tarfus; l, the metatarfus; m, the phalanges of the toes; *a*, the head of the radius; *b*, the head of the ulna; *c*, the bones of the carpus; *d*, the lower appendix, which receives the head of the radius; *e*, the lower appendix, which receives the head of the ulna; *f*, the upper head of the os femoris, which is received into the acetabulum or coxendix; *g*, the outer trochanter; *i*, the trochanter minor; *k*, *l*, the two lower heads of the thigh bone; *p*, the head of the tibia; *q*, the os calcis; *r*, the articulation of the fibula with the tibia.

Fig. 2. *ibid.* is a hind-view of the vertebræ

tebræ of the neck; *a, a, a, &c.* being the tranſverſe proceſſes, and *b, b, b, &c.* the ſpine or direct proceſſes.

Fig. 3. is a hind-view of the vertebræ of the back; *a, a, a,* being the ſpine or direct proceſſes, and *b, b, b,* the tranſverſe proceſſes.

Fig. 4. is a hind-view of the vertebræ of the loins, *a, a, a,* being the ſpine, and *b, b, b,* the tranſverſe proceſſes.

Fig. 5. is the thigh-bone ſawed longitudinally through the middle; B, B, being the union of the bone with its epiphyſis; and fig. 6. the marrow viewed with a microſcope.

Fig. 6. the os ilium ſawed through; by comparing which with fig. 5. the different internal ſtructure of round and broad bones is ſeen.

Fig. 7. A poſterior view of the two naſal bones; A, their ſuperior ſides; B, their exterior ſides; C, their inferior ſides.

Fig. 8. A view of the lower part and ſide next the noſe of the left os maxillare, with the palate-bone, and os turbinatum inferius; *γ*, the naſal proceſs; *δ*, the great tuber; *ε*, the palate-plate; *ζ*, the naſal ſpine; *η*, the orifice of the antrum maxillare; *κ*, the os ſpongioſum, or turbinatum inferius; *λ*, the two dentes inciſores; *μ*, the caninus; *ν*, the five dentes molares.

Fig. 9. A tooth cut perpendicularly, viewed with a microſcope; A, the fibres of the cortical part; B, the bony part; C, the entry at the point of the root to D, the channel for the nerve and blood-veſſels.

Fig. 10. A view of the ſurface next to the mouth of the right ſide of the lower jaw; 1, the ſubſtance in the middle of the chin; 2, the baſe of the jaw; 3, the angle; 4, the corone; 5, the condyle; 6, the rough print of the internal pterygoid muſcle; 7, the entry of the channel for the nerve and blood-veſſels; 8, the five grinders.

SKIE, one of the greateſt weſtern iſlands of Scotland, divided from the counties of Roſs and Invernefs by a narrow channel; being upwards of ſixty miles in length and twenty in breadth.

SKIFF, or SQUIFF, the leaſt of two ſhip-boats, ſerving chiefly to go aſhore in, when the ſhip is in harbour.

SKIN, *cutis*, in anatomy. See the articles CUTIS and CUTICLE.

SKIN, in commerce, is particularly uſed for the membrane ſtripped off the animal to be prepared by the tanner, ſkinner, currier, parchment-maker, *&c.* and converted into leather, *&c.* See LEATHER, FURR, PARCHMENT, HIDE, *&c.*

Skins and the hair of beaſts manufactured become parchment and vellum; leather, of which are made ſhoes and boots, ſaddles, harneſſes, and furniture for horſes, gloves and garments, coaches and chairs, houſhold ſtuff, covers of books, drinking veſſels, *&c.* and furrs for cloathing, hats, caps, *&c.* Theſe branches of trade that are derivable from the ſkin trade, render it a very great mercantile concern, and well deſerving preſervation as much as we can within ourſelves. The Britiſh have greatly increaſed their quantity of furrs and ſkins of all ſorts from their northern colonies, ſince they planted northward towards Nova-ſcotia, but more eſpecially ſince they have poſſeſſed themſelves of Canada. The ſeveral ſorts of ſkins brought to Europe from thoſe parts are of the following kinds, *viz.* deer-ſkins, bear, beaver, otter, rackoon, fox, elk, cat, wolf, martin, mink, muſqueſh, fiſher, *&c.*

Elk-ſkins, dreſſed or undreſſed, pay, on importation, 1 s. $5\frac{23\frac{1}{2}}{100}$ d. *per* ſkin; and draw back, on exportation, 1 s. $3\frac{52\frac{1}{2}}{100}$ d. and more, if dreſſed in oil, for every pound weight, on importation, 7 d. and draw back, on exportation, $4\frac{66\frac{2}{3}}{100}$ d. Fox-ſkins, the dozen, pay, on importation, 3 s. $9\frac{96}{100}$ d. and draw back, on exportation, 3 s. $5\frac{40}{100}$ d. and for every twenty ſhillings value, upon oath, on importation, pay 6 s. Goat-ſkins, in the hair, not otherwiſe rated, the dozen, pay, on importation, 4 s. $9\frac{45}{100}$ d. and draw back, on exportation, 4 s. $3\frac{75}{100}$ d. but thoſe of Ireland, the dozen, on importation, pay only 1 s. $7\frac{15}{100}$ d. and draw back, on exportation, 1 s. $5\frac{75}{100}$ d. and when tanned, the dozen, pay, on importation, 13 s. $6\frac{90}{100}$ d. and draw back, on exportation, 8 s. $7\frac{50}{100}$ d. Hare-ſkins, the dozen, pay, on importation, $9\frac{5\frac{3}{4}}{100}$ d. and draw back, on exportation, $8\frac{6\frac{1}{4}}{100}$ d. Kid-ſkins, in the hair, the hundred, pay, on importation, 17 s. $3\frac{45}{100}$ d. and draw

draw back, on exportation, 4 s. $3\frac{75}{100}$ d. and for every twenty shilling value, upon oath, they pay 4 s. $9\frac{45}{100}$ d. and draw back, on exportation, 4 s. $3\frac{75}{100}$ d. Lamb-skins, dressed in alum, pay the hundred, on importation, 4 s. $9\frac{45}{100}$ d. and draw back, on exportation, 4 s. $3\frac{75}{100}$ d. dressed in oil, every hundred, pay, on importation, 19 s. $1\frac{80}{100}$ d. and draw back, on exportation, 17 s. 3 d. undressed, in the wool, the hundred and twenty, pay, on importation, 2 s. $4\frac{27\frac{1}{2}}{100}$ d. and draw back, on exportation, 2 s. $1\frac{87\frac{1}{2}}{100}$ d. tanned, for every twenty shillings value, upon oath, the lamb skins pay, on importation, 4 s. $9\frac{45}{100}$ d. and draw back, on exportation, 4 s. $3\frac{75}{100}$ d. Lion and panther-skins, undressed, the piece, pay, on imtation, 2 s. $4\frac{72\frac{1}{2}}{100}$ d. and draw back, on exportation, 2 s. $\frac{87\frac{1}{2}}{100}$ d. and the mouse skins, and the pelts of goats, undressed, pay the same duties, both on importation and exportation, as the lion and panther-skins do. Seal-skins, on importation, pay, *per* skin, $4\frac{78\frac{3}{4}}{100}$ d and draw back, on exportation, *per* skin, $4\frac{31\frac{1}{4}}{100}$ d. Shagreen-skins, each, on importation, pay $4\frac{78\frac{3}{4}}{100}$ d. and draw back, on exportation, $4\frac{31\frac{1}{4}}{100}$ d. Sheep-skins dressed, the dozen, pay, on importation, 1 s. $2\frac{36\frac{1}{4}}{100}$ d. and draw back, on exportation, 1 s. $\frac{93\frac{3}{4}}{100}$ d. Slink calf-skins, dressed with the hair on, the pound, pay, on importation, 2 d. and draws back, on exportation, $1\frac{33\frac{1}{3}}{100}$ d. and dressed without the hair, the pound, pay, on importation, 1 d. and draw back, on exportation, $\frac{66\frac{2}{3}}{100}$ d.

SKINK, or ALSCHARCUR, in zoology, and the materia medica, a small animal of the lizard kind, brought to us dry from Egypt, and recommended as a great restorative. See the article LIZARD.

Whatever virtues this medicine may have fresh, as used by the Egyptians, it is observed, that it has none as it comes to us, and serves uselesly to increase the articles of the mithridate. See MITHRIDATE.

SKINNER, one who works in skins. Skinners, or fellmongers, shall not retain any journeyman, *&c.* to work in their trade, except they themselves have served seven years as apprentices thereto, on pain of forfeiting double the value of the wares wrought by such persons. 3 Jac. I. c. 9.

SKIPTON, a town in the west riding of Yorkshire, situated thirty five miles west of York.

SKIRMISH, in war, a disorderly kind of combat, or encounter, in presence of two armies, between small parties, or persons, who advance from the body for that purpose, and introduce to a general and regular fight.

SKULL, *cranium et calvaria*, in anatomy, that part of the head which forms its great bony cavity; and in a living subject contains the brain. See the articles HEAD and BRAIN.

The shape of the skull is oval; its exterior surface is convex; and its interior, concave: its round figure is an advantage to its capacity: it is a little depressed and longish, advancing out behind and flatted on the two sides that form the temples, which contributes to the enlargement of the sight and hearing: it is of unequal thicknefs in the several parts, and is composed of two lamellæ, or tables, an exterior and interior, laid or applied over each other, between which there is a diploë, or meditullium, being a thin spongious substance, made of bony fibres detached from each lamina, and full of little cells of different bignesses: the tables are hard and solid, the fibres being close to one another; the diploë is soft, in regard the bony fibres are here at a greater distance; a contrivance whereby the skull is not only made lighter, but less liable to fractures: the external lamina is smooth and covered with the pericranium: the internal is likewise smooth, abating the furrows made by the pulsation of the arteries of the dura mater before the cranium be arrived at its consistence: it has several holes, through which it gives passage to the spinal marrow, nerves, arteries, and veins, for the conveyance and re-conveyance of of the blood, *&c.* between the heart and the brain. See the articles DIPLOE, PERICRANIUM, DURA-MATER, *&c.*

The bones of the skull are eight, *viz.* the

the os frontis, the two parietal bones, the two bones of the temples, the occipital, the fphenoides, and the ethmoides; each of which are defcribed under their feveral names. See the articles FRONTIS OS, PARIETALIA OSSA, PETROSA OSSA, OCCIPITIS OS, &c.

All the bones of the cranium are found to be imperfect in new-born infants: the finus and its meditullium are almoft wholly wanting; the bony fibres in the formation of almoft all of them, are carried in form of rays from a center towards the circumference; and moft of them are not fingle, as in adults, but compofed each of feveral fruftules, or little pieces; nor are the futures at that time formed, and frequently there are triquetrous little bones between them. In adults the feveral bones of the fkull are in general joined by futures: thefe futures are either common or proper; the proper futures are diftinguifhed into the true and the falfe or fpurious; they are called true futures when the bones are joined together by means of a multitude of unequal denticulated eminences, forming an appearance fomewhat like the edge of a faw: thefe denticulations enter mutually into each others finufes, and on the outfide are moft plainly vifible: of this kind are thofe called the coronal, fagittal and lambdoidal futures. The falfe or fpurious futures, are thofe fquammofe ones of the temporal and parietal bones, and of the os frontis and fphenoides, in the angle where they unite with the parietal ones. The common futures are the tranverfal one which joins the os frontis with the bones below it, the fphenoidal, the ethmoidal, and the zygomatic; but thefe are of little moment. Some authors mention the having met with fkulls in which there were no futures at all. Between the futures, particularly the lambdoidal and fagittal, there are found, in many fkulls, certain fmall bones; thefe are called, by fome, offa triquetra, from their figure; by others, offa wormiana: they are uncertain in their figures and fituation, and are joined to the others by futures: thefe bones are by fome efteemed a great medicine in epilepfies.

The ufe of the futures is, 1. That the dura mater may in thofe parts be very firmly joined to the cranium and pericranium. 2. That, in infants, the head may the more eafily be extended in its growth from the feveral bones being at that period difunited at thefe places. 3. That the tranfpiration from the brain may be the more free and eafy at that time of life in which they are open, and at which alfo the habit is more humid. 4. That very large fractures of the fkull might in fome meafure be prevented: and finally, there is another advantage in their opennefs in children; namely, that medicinal applications to the external part of the head may penetrate and do fervice.

The foramina in the cranium are numerous, and their ufes important: thefe are divided into the external and internal: by the external are meant thofe which are eafily difcovered on the external furface of the fkull; and by the internal are meant thofe which are moft obvious in the internal furface: of the larger internal foramina we count eleven pair, affording paffage to the arteries, veins, and nerves of the brain; befides thefe, we are to remark one which is fingle, namely, the great foramen of the occipital bones, that gives paffage to the medulla fpinalis, and with it to the acceffory fpinal nerves, and to the vertebral arteries. Particular regard is to be had to the firft pair of thefe foramina, (which may indeed be more properly called a congeries of the foramina of the os cribrofum) thefe give paffage to the filaments of the firft pair of nerves, called the olfactory nerves: the fecond pair are in the fphenoidal bones, and give paffage to the optic nerves: the third pair are called the unequal and lacerated foramina, and give paffage to the third and fourth pair of the nerves, to the firft branch of the fifth pair, and to the fixth pair; as alfo to the emiffary of the receptacles of the dura mater: the fourth pair are in the fphenoidal bone, and give paffage to the fecond branch of the fifth pair of nerves, which is diftributed to the feveral parts of the upper jaw: the fifth, or oval foramina, give paffage to the third branch of the fifth pair, and to the emiffary of the dura mater: the fixth is a very fmall foramen, and admits of an artery, which is diftributed over the dura mater, and is that which forms the impreffions of little fhrubs or trees on the parietal bones: the feventh is placed between the fella equina and the petrofe apophyfis, and it tranfmits no veffels, but is fhut up by the dura mater: the eighth pair of foramina give paffage to the carotid arteries, whence it is called the carotic foramen; and the intercoftal nerve has

has its egrefs alfo at this opening: through the ninth, which is in the os petrofum, paffes the auditory nerves: through the tenth, which is between the os petrofum and the occipital bone, pafs the par vagum and the lateral finufes of the dura mater, together with the fpinal nerve: the eleventh is in the os occipitis, near the edge of the foramen magnum; and through this pafs the ninth pair of nerves, called the linguale. See NERVES, &c.

Befides thefe foramina, there are a number of little ones in the os petrofum, often very vifible; one of thefe carries back a branch of the auditory nerve to the dura mater; and the other principal one tranfmits the fanguiferous veffels to the labyrinth, or the internal organ of hearing. See the article EAR.

Of the external foramina, there are two proper ones of the os frontis, a little above the orbits; thefe are, from their fituation, called fupraorbitalia: they give paffage to the opththalmic nerve of Willis. Befides thefe, there are four other foramina common to the os frontis, and to the plane or papyraceous bones of the orbit; two of thefe are placed on each fide, and they tranfmit little nerves and veffels to the finus of the ethmoidal bone. In the parietal bone there is one, which ferves for the paffage of a vein from the cutis of the cranium into the fagittal finus of the dura mater, or from the fagittal finus to the external veins of the head; but this is often wanting. In each of the offa temporum there are three common foramina; the firft of thefe is the foramen jugale, which ferves for the paffage of the crotaphite-mufcle; the fecond is large, in which is the finus of the jugular vein; and the third is the ductus Euftachii, fituated between the petrofum and the fphenoides, and leading from the mouth into the internal ear. Befides thefe common foramina of the offa temporum, there are alfo three proper ones: 1. The meatus auditorius. 2. The aquæduct of Fallopius, fituated between the maftoide and ftyloide procefs, and tranfmitting the hard portion of the auditory nerve. 3. A foramen behind the maftoide procefs, ferving for the ingrefs of a vein into the lateral finus, or for the egrefs of one from the lateral finus into the veins of the occiput. In the occipital bone there are two foramina, fituated behind the condyloide apophyfes, and ferving to give paffage to the vertebral veins, into the lateral finufes of the dura mater; thefe, however are wanting in many fkulls. In the fphenoides, befides the internal ones already defcribed, are the apertures of the finufes into the noftrils, common to them with the bones of the palate, and which are the apertures of the nares and fauces; there is another canal in the upper part of the pterygoide proceffes, ferving for the paffage of the novum emiffarium of the dura mater. In the os ethmoides there are. 1. Thofe common to this bone with the os frontis, fituated in the interior fide of the orbit, and already defcribed. And, 2. The apertures of the ethmoidal finufes into the noftrils. In the examination of different fkulls, other foramina, befides thefe, will occafionally be found in different places; but thefe are either extraordinary and lufus naturæ, as is often the cafe; or they are otherwife fuch as ferve only to give paffage to veffels ferving for the nutrition of the bones in which they ftand.

For the foramina of the maxillary bones, fee the article MAXILLÆ.

For a view of the human fkull, fee the article SKELETON.

For the method of treating fiffures, &c. of the fkull, fee the articles FISSURE, CONTRA-FISSURE, EXTRAVASATION, FRACTURE, &c.

For the treatment of depreffions of the fkull, fee the articles TREPANNING and ELEVATORY.

*Concealed injuries and wounds of the* SKULL. When a blunt inftrument is the occafion of any injury of the cranium, if the injured part does not fufficiently appear of itfelf, great induftry is neceffary to difcover it. Where the common integuments appear tumid and foft, they are in this cafe to be divided to the bone; but in making the incifion, care muft be taken not to lay too much ftrefs upon the knife, left fplinters of the fractured cranium fhould, by that means, be forced upon the brain. The beft way to make this incifion, according to Heifter, is in form of the letter X, and about an inch and half in length, lifting up the fkin at each angle, and leaving the bone bare. The blood that is fpilt may be taken up by a fponge, and dry lint ftuffed between the fkin and the cranium: and having thus found out the injured part of the cranium, the trepan is to be applied, if it be found neceffary. If fplinters of the bone are now found, they muft be removed either with the fingers or forceps, or, when they hang to the cranium, with fciffars; but when they

they adhere pretty firmly to the neighbouring parts of the cranium, it is more adviseable to replace them, than to endeavour to remove them by violence.

In wounds of the cranium, or ſkull, the firſt buſineſs is to find whether they are terminated in the external parts of the cranium, or whether they penetrate into its cavity: this is to be known, 1. By the eye. 2. By the probe; which, however, muſt be gently uſed here, for fear of bringing on farther miſchief. 3. By examining the inſtrument with which the blow was given, and conſidering the degree of force with which it was impelled. And, laſtly, the preſence or abſence of very bad ſymptoms; for a violent blow upon the head will always be attended with vomitings and vertigos, and blood will be diſcharged from the noſe, ears, and mouth, and the wounded perſon will loſe his ſpeech and ſenſes. Theſe diſorders will appear, ſometimes ſooner and ſometimes later, but are always moſt violent, when the wound is by a fall, or by ſome blunt inſtrument; in which caſes the cranium is uſually much ſhattered. The blood which diſcharges itſelf by the wound, that is made by a ſharp inſtrument, will inſinuate itſelf between the common integuments and the cranium: in the contuſions that are made with blunt inſtruments, ſometimes it will be concealed under the cranium; and, by corrupting the perioſteum and the cranium, will bring on ulcers and caries of the bone, and frequently occaſions fevers, convulſions, and death. See CONTUSION, EXTRAVASATION, CARIES, &c.

SKY, the blue expanſe of air and atmoſphere. See the articles AIR, ÆTHER, and ATMOSPHERE.

The azure colour of the ſky Sir Iſaac Newton attributes to vapours, beginning to condenſe there, and which have got conſiſtence enough to reflect the moſt reflexible rays. M. De la Hire attributes it to our viewing a black object, *viz.* the dark ſpace beyond the regions of the atmoſphere, through a white or lucid one, *viz.* the air illuminated by the ſun; a mixture of black and white always appearing blue. See the article COLOUR.

SLAB, an outſide ſappy plank or board ſawed off from the ſides of a timber-tree: the word is alſo uſed for a flat piece of marble.

SLANEY, a city of Bohemia, ſituated 18 miles north-weſt of Prague.

SLATE, *ſtegania*, in the hiſtory of foſſils, a ſtone of a compact texture and laminated ſtructure, ſplitting into fine plates.

Dr. Hill diſtinguiſhes four ſpecies of ſtegania: 1. The whitiſh ſteganium, being a ſoft, friable, ſlaty ſtone, of a tolerably fine and cloſe texture, conſiderably heavy, perfectly dull and deſtitute of brightneſs, variegated with a pale brown, or browniſh yellow: this ſpecies is very common in many counties in England, lying near the ſurface of the ground; it is generally very full of perpendicular as well as horizontal cavities, many of which are filled up with a ſpar a little purer and more cryſtalline than the reſt, and is commonly uſed for covering houſes. 2. The red ſteganium is a very fine and elegant ſlate, of a ſmooth ſurface, firm and compact texture, conſiderably heavy, and of a very beautiful pale purple, glittering all over with ſmall gloſſy ſpangles: it is compoſed of a multitude of very thin plates or flakes, laid cloſely and evenly over one another, and cohering pretty firmly: this is very common in the northern parts of England, and is much valued as a ſtrong and beautiful covering for houſes. 3. The common blue ſteganium is very well known, as an uſeful and valuable ſtone, of a fine ſmooth texture and gloſſy ſurface, moderately heavy, and of a pale greyiſh blue; compoſed of a multitude of even plates, laid cloſe upon one another, and eaſily ſplitting at the commiſſures of them: this is alſo very common in the north parts of England, and is uſed in moſt places for the covering of houſes. There are other ſpecies of this ſlate, *viz.* the browniſh blue friable ſteganium, uſually called coal ſlate; the greyiſh black friable ſteganium, commonly called ſhiver; and the greyiſh blue ſparkling ſteganium. 4. The friable, aluminous, black ſteganium, being the iriſh ſlate of the ſhops: this is compoſed of a multitude of thin flakes, laid very evenly and regularly over one another, and ſplits very readily at the commiſſures of them. It is common in many parts of Ireland, and is found in ſome places in England, always lying near the ſurface, in very thick ſtrata. In medicine it is uſed in hæmorrhages of all kinds with ſucceſs, and is taken often as a good medicine in fevers.

There is a ſort of ſlate-ſtones called, by Dr. Hill, ammoſchiſta; of this kind there are

are only two fpecies: 1. That compofed only of fparry and cryftalline particles; or the grey, friable, dull ammofchiftum; being a coarfe, harfh, and rough ftone, of a very loofe texture, confiderably heavy; and compofed of a large, coarfe, obtufely angular gritt, furrounded, and in part held together, by a loofe earthy fpar. This ftone is very common in moft countries, and is frequently ufed to cover houfes, inftead of tiles: it bears the weather but badly, and is apt to crumble after frofts. 2. That compofed of talcy, fparry, and cryftalline particles. This comprehends five fpecies, *viz.* the brownifh white glittering ammofchiftum; the greenifh grey fhining ammofchiftum; the yellowifh grey glittering ammofchiftum; the hard purple and white laminated ammofchiftum; and the bluifh glittering flate-ftone. Thefe forts of flate-ftone are very common in the northern countries, and are ufed for covering houfes, paving, building, *&c.*

SLAVE, a perfon in the abfolute power of a mafter, either by war or conqueft. We find no mention of flaves before the deluge; but immediately after, *viz.* in the curfe of Canaan: whence it is eafily inferred, that fervitude increafed foon after that time; for in Abraham's time we find it generally eftablifhed. Some will have it to commence under Nimrod, becaufe it was he who firft began to make war, and of confequence to make captives; and to bring fuch as he took, either in battles or irruptions, into flavery. Among the Romans, when a flave was fet at liberty, he changed his name into a furname, and took the nomen or prænomen of his mafter; to which he added the cognomen he had been called by, when a flave. Great part of the roman wealth confifted in flaves: they had the power of life and death over them, which no other nation had; but this feverity was afterwards moderated by the laws of the emperors. The flaves were efteemed the proper goods of their mafters, and all they got belonged to them; but if the mafter was too cruel in his correction, he was obliged to fell his flave at a moderate price. The Romans not only approved of, but even invented, new manners of making flaves: for inftance, a man born free among them might fell his freedom and become a flave. There were generally three ways of obtaining flaves; either when they bought them with the booty taken from the enemy, diftinct from the fhare referved for the public; or of thofe who took them prifoners in war; or of merchants who dealt in them, and fold them at fairs.

Slavery is abfolutely abolifhed in Britain and France, as to perfonal fervitude. Slaves make a confiderable article of the traffic in America. The englifh fouth-fea company have, by treaty, the fole privilege of furnifhing the fpanifh Weft-Indies with flaves. See NEGROES.

For an account of the Lacedemonian flaves, fee the article HELOTS.

For the cuftom of marking or ftigmatizing flaves, fee STIGMATIZING.

SLAUGHTER. See MANSLAUGHTER, HOMICIDE, MURDER, BUTCHER, *&c.*

Slaughter fkins is a term ufed by our curriers and leather-dreffers, for the fkins of oxen or other beafts, when frefh and covered with the hair; fuch as they receive them from the flaughter houfes, where the butchers flea the carcafs.

SLEDGE, a kind of carriage without wheels, for the conveyance of very weighty things, as huge ftones, *&c.*

This is alfo the name of a large fmith's hammer, to be ufed with both hands. Of this there are two forts; the uphand-fledge, which is ufed by under-workmen, when the work is not of the larger fort; it is ufed with the hands before, and they feldom raife it higher than their head; but the other, which is called the about-fledge, and which is ufed for battering or drawing out the largeft work, is held by the handle with both hands, and fwung round over their heads, at their arm's end, to ftrike as hard a blow as they can.

SLEEP is defined to be that ftate wherein the body appearing perfectly at reft, external objects move the organs of fenfe as ufual, without exciting the ufual fenfations. Sleep, according to Rohault, confifts in a fcarcity of fpirits, which occafions that the orifices or pores of the nerves in the brain, whereby the fpirits ufed to flow into the nerves, being no longer kept open by the frequency of the fpirits, fhut up of themfelves. For, this being fuppofed, as foon as the fpirits, now in the nerves, fhall be diffipated, the capillaments of thofe nerves, having no fupplement of new fpirits, will become lax, and cohere as if cemented together, and fo be unfit to convey an impreffion to the brain: befides, the mufcles being now void of fpirits, will be unable to move, or even to fuftain the members; thus will

fenfation

senfation and motion be for the time deftroyed. See the article WATCHING. Sleep is broken off unnaturally, when any of the organs of fenfation is fo brifkly acted on, that the action is propagated to the brain; for upon this, the new fpirits remaining in the brain, are all called together, and unite their forces to unlock the pores of the nerves, &c. But if no object fhould thus affect the organ, yet fleep would in fome time be broken off naturally; for the quantity of fpirits generated in fleep, will at length be fo great, that ftretching out the orifices of the nerves, they will open themfelves a paffage. See the articles ANIMAL SPIRITS, CIRCULATION, &c.

With regard to medicine, fleep is defined by Boerhaave, to be that ftate of the medulla of the brain, wherein the nerves do not receive fo copious nor fo forcible an influx of fpirits upon the brain, as is required to enable the organs of fenfe and voluntary motion, to perform their functions. Sleep being one of the non-naturals, it is not poffible for thofe to preferve their health, who do not go to fleep in a regular manner; for fleep repairs the fpirits, which are diffipated by watching; and confequently it reftores the ftrength of thofe who are weak, indifpofed, or labour much. It likewife promotes perfpiration, contributes greatly to digeftion, and more to nutrition. The night is the moft proper for fleep; for the vigour of the mind and body are better reftored in the night than in the day; thus nocturnal labour and lucubrations impair the health. A found undifturbed fleep is much the beft: unquiet interrupted fleep contributes little to reftore the ftrength, and hinders perfpiration and digeftion. Exercife and cuftom ought to regulate the duration of fleep: fix or feven hours at a time is generally thought to be fufficient; for too much fleep makes a perfon fluggifh, heavy, dulls the faculties, and renders them unfit for bufinefs. Immoderate watching is as prejudicial to health, as fleep is beneficial: it may occafion great diforders, in the animal œconomy, by wafting the fpirits, and more fluid parts of the blood. The beft place for fleep, is a dry fpacious room, where the air is good; for clofe, little, moift places, too much heated, are bad. The beft pofture, is to lie on the right fide at night, and on the left in the morning, with the head raifed and the body bent. See REGIMEN, &c. Some of the more extraordinary phænomena of fleep, yet to be accounted for, are, that when the head is hot, and the feet cold, fleep is impracticable; that fpirituous liquors firft bring on drunkennefs, and then fleep; that perfpiration in time of fleep is twice as great as at other times; that upon fleeping too long, the head grows heavy, the fenfes dull, the memory weak, with a coldnefs, pituitoufnefs, an indifpofition of the mufcles for motion, and a want of perfpiration; that much fleep will fuftain life a long time, without either meat or drink; that upon a laudable fleep, there always follows an expanfion of all the mufcles, frequently a repeated yawning, and the mufcles and nerves acquire a new agility; that fœtufes always fleep, children often, youth more than grown perfons, and they more than old perfons; and that people recovering from violent diftempers fleep much more than when in perfect health. For the fleepy difeafes, fee the articles CARUS, COMA-VIGIL, COMA-SOMNOLENTUM, LETHARGY, &c.

SLEEPER, or the GREAT SLEEPER, in zoology, the hairy-tailed mus with red feet. See the article MUS.

This is of the fize of the rat, but more corpulent; the head is fhort and thick; the opening of the mouth fmall; the noftrils flefh coloured; the eyes large, black, and prominent; and the ears large and naked. This is frequent in many parts of Europe, and retires in winter into caverns under the ground, where it carries however a confiderable ftore of nuts and other fruits.

SLEEPERS, in natural hiftory, a name given to fome animals, which are faid to fleep all the winter; fuch as bears, marmotes, dormice, bats, hedge-hogs, fwallows, &c. We are told, in Med. Effays of Edinb. that thefe do not feed in winter, have no fenfible evacuations, breathe little or none at all, and that moft of the vifcera ceafe from their functions. Some of thefe creatures feem to be dead, and others to return to a ftate like that of the fœtus before the birth: in this condition they continue, till by length of time maturating the procefs, or by new heat, the fluids are attenuated, the folids ftimulated, and the functions begin where they left off.

SLEEPERS, in the glafs-trade, are the large iron bars croffing the fmaller ones, and hindering the paffage of the coals, but leaving room for the afhes.

SLEEPERS, in a fhip, timbers lying before and

and aft, in the bottom of the ship, as the rung-heads do; the lowermost of them is bolted to the rung-heads, and the uppermost to the futtocks and rungs.

SLESWICK, the capital of the dutchy of Sleswick, otherwise called South Jutland, situated on the river Sley: east longit. 9° 45, and north lat. 54° 45′. See the article JUTLAND.

SLIDING, in mechanics, is when the same point of a body, moving along a surface, describes a line on that surface.

For the sliding rule as variously contrived by Everard, Coggeshal, Gunter, Hunt, and Partridge, see the article RULE.

SLIGO, a county of Ireland, in the province of Connaught, bounded by the ocean on the north, by Letrim on the east, by Roscommon, on the south, and by Mayo on the west.

SLING, *funda*, an instrument serving for casting stones with great violence. The inhabitants of the Balearic islands were famous in antiquity, for the dexterous management of the sling: it is said they bore three kinds of slings, some longer, others shorter, which they used according as their enemies were either nearer or more remote. It is added, that the first served them for a head-band, the second for a girdle, and that a third they constantly carried with them in the hand.

SLINGING is used variously at sea, but chiefly for the hoisting up casks, or other heavy things, with slings, *i. e.* contrivances of ropes spliced into themselves, at either end, with one eye big enough to receive the cask, or other thing, to be slung.

SLIPPING, among gardeners, the tearing off a sprig from a branch, or a branch from an arm of the tree. These sort of slips take root more readily than cuttings.

SLOANEA, or SLOANA, in botany, a genus of the polyandria-monogynia class of plants, having no corolla but the calyx, which is sometimes taken for one; the fruit is a large, roundish, echinated capsule, formed of four valves; the seeds are oval, obtuse, fleshy, and have long nuclei.

SLOATH, or SLOTH, *bradypus*, in zoology. See the article BRADYPUS.

The face of the sloath is covered with hair; the claws are of a subulated form; there are no ears, nor are there any middle teeth. This is a very extraordinary animal, both in figure and qualities. It is hard to say to what other it is equal in size, since it is like none in shape; the length of the body is about a foot, and when well fed its thickness is equal to its length; the feet are flatted or plain, in the manner of those of the bear or monkey, but are extremely narrow; the claws are very long and sharp; the head is small and round; and the face something resembling that of the monkey; the colour of the whole animal is a pale greyish brown. It is the slowest mover of all the quadrupeds; the traversing the space of fifty yards is the labour of a day for it: it is usually seen on the tops of tall trees, for security.

SLOATS *of a cart*, the under-pieces which keep the bottom of the cart together. See the article CART.

SLOE, *prunus sylvestris*, the english name for the wild plum. See PRUNUS.

SLONIM, a city of Poland, in the province of Lithuania, and palatinate of Novogrodeck, situated in east long. 25°, and north lat. 53°.

SLOOP, a sort of floating vessel, otherwise called shallop. In our navy, sloops are tenders on the men of war, and are usually of about sixty tons, and carry about thirty men. See the article SHIP.

SLOOT, or SLOTEN, a town of the United Netherlands in the province of Friesland, situated twenty-one miles south of Lewarden.

SLOT, among sportsmen. Drawing on the slot, see the article DRAWING.

SLOTH, or SLOATH. See SLOATH.

SLOUGH, a deep muddy place. The cast skin of a snake, the damp of a coal-pit, and the scar of a wound, are also called by the same appellation. The slough of a wild boar is the bed, soil, or mire, wherein he wallows, or in which he lies in the day-time.

SLOUTH, or SLOUGHT, in hunting, is used for a company of some sorts of wild beasts, as a slouth of bears.

SLOW-WORM, in zoology, the english name for a species of anguis. See the article ANGUIS.

SLUCZK, the capital of the palatinate of the same name, in the dutchy of Lithuania and kingdom of Poland, situated in east long. 27°, and north lat. 53°.

SLUICE, in hydraulics, a frame of timber, stone, earth, &c. serving to retain and raise the water of the sea, a river; &c. and on occasion to let it pass: such is the sluice of a mill, which stops and collects the water of a rivulet, &c. in order to discharge it at length, in greater plenty, upon

upon the mill-wheel: ſuch alſo are thoſe uſed in drains, to diſcharge water off lands; and ſuch are the ſluices of Flanders, *&c.* which ſerve to prevent the waters of the ſea overflowing the lower lands, except when there is occaſion to drown them.

Sometimes there is a canal between two gates or ſluices, in artificial navigation, to ſave the water, and render the paſſage of boats equally eaſy and ſafe, upwards and downwards; as in the ſluices of Briare, in France, which are a kind of maſſive walls, built parallel to each other at the diſtance of twenty or twenty-four feet, cloſed with ſtrong gates at each end, between which is a kind of canal or chamber, conſiderably longer than broad, wherein a veſſel being incloſed, the water is let out at the firſt gate, by which the veſſel is raiſed fifteen or ſixteen feet, and paſſed out of this canal into another much higher. By ſuch means a boat is conveyed out of the Loire into the Seyne, though the ground between them riſe above one hundred and fifty feet higher than either of thoſe rivers.

*Conſtruction of* Sluices. The conſtruction of ſluices ought to be conducted by an able engineer, who is well acquainted with the action of fluids in general; and particularly with the ſituation of the place, the nature of the ſoil, *&c.* where the ſluice is to be erected: if on the ſea-ſhore, he ought to be perfectly well acquainted with the effects of the ſea on that coaſt, and the ſeaſons when it is calm or ſtormy, that he may be able to prevent the fatal accidents thence ariſing: and, if in a river, it is neceſſary to know whether it uſually overflows its banks, and at what ſeaſons of the year its waters are higheſt and loweſt. The machines for driving the piles ſhould be placed about forty yards from the ſide of the ſluice, above and below it. As to the depth of ſluices, it muſt be regulated by the uſes for which they are deſigned; thus if a ſluice is to be erected at the entrance of a baſon for ſhipping, its depth muſt correſpond with the draught of water of the largeſt ſhip that may, at any time, have occaſion to enter thereby. The rule uſually obſerved, is to make the ſurface of the bottom of the canal on a level with the low-water-mark: but if the bottom of the harbour and canal be ſuch, as to be capable of becoming deeper by the action of the water, Belidor very juſtly obſerves, that the bottom of the ſluice-work ſhould be made deeper than either.

When a ſluice is to be placed at the bottom of an harbour, in order to waſh away the filth that may gather in it, by means of the waters of a river or canal, in this caſe the bottom of the ſluice-work ſhould be two feet or eighteen inches higher than the bottom of the harbour, that the water may run with the greater violence.

An engineer ought always to have in his view, that the faults committed in the conſtruction of ſluices are almoſt always irreparable. We ſhall therefore lay down ſome rules, from Belidor, for avoiding any overſight of this kind: 1. In order to adjuſt the level of the ſluice work with the utmoſt exactneſs, the engineer ought to determine how much deeper it muſt be than a fixed point: and this he ſhould mark down in his draught, in the moſt preciſe terms poſſible. 2. When the proper depth is ſettled, the foundation is next to be examined; and here the engineer cannot be too cautious, leſt the apparent goodneſs of the ſoil deceive him: if the foundation is judged bad, or inſufficient to bear the ſuperſtructure, it muſt be ſecured by driving piles, or a grate-work of carpentry. 3. There ſhould be engines enough provided for draining the water; and theſe ſhould be entirely under the direction of the engineer, who is to take care that they be ſo placed as not to be an obſtacle to the work; and alſo cauſe proper trenches to be cut, to convey the water clear off from the foundation. 4. When the ſluice is to be built in a place where the workmen will be unavoidably incommoded by the waters of the ſea, *&c.* all the ſtones for the maſon-work, as well as the timbers for that of carpentry, ſhould be prepared beforehand; ſo that when a proper ſeaſon offers for beginning the work, there remains nothing to be done, but to fix every thing in its place. 5. In order to ſhew the ſtate of the work, an exact journal ſhould be kept of the materials employed, to be ſigned every week by the chief engineer and undertaker; obſerving to diſtinguiſh the different pieces of materials, and the places where they were employed. 6. When an undertaker is found, who is not only able to be at the expence of providing all the materials, but likewiſe vigilant and active to execute whatever is judged neceſſary for the perfection of the work, it would be the worſt of policy

licy to give the preference to others, who, through ignorance, or diſhoneſty, bring in eſtimates lower than it is poſſible to execute the work as it ought. However, that the conditions of the contract may be properly executed, the chief engineer, or other perſons of unqueſtionable underſtanding and honeſty, commiſſioned for that purpoſe, ſhould take care that able workmen be employed, and that they execute their ſeveral parts in a proper manner.

Sluices are made different ways, according to the uſes they are intended for: when they ſerve for navigation, they are ſhut with two gates, preſenting an angle towards the ſtream; but when made near the ſea, there are two pair of gates, one to keep the water out, and the other to keep it in, as occaſion requires: the pair of gates next the ſea preſent an angle that way, and the other pair the contrary way; the ſpace incloſed by theſe gates is called a chamber.

When ſluices are deſigned to detain the water in ſome parts of the ditch of a fortreſs, they are made with ſhutters to ſlide up and down in grooves; and when they are made to cauſe an inundation, they are then ſhut by means of ſquare timbers let down into cullifes, ſo as to lie cloſe and firm.

Particular care muſt be taken, in the building of a ſluice, to lay the foundation in the ſecureſt manner poſſible; to lay the timber-grates and floors in ſuch a manner, that the water cannot penetrate through any part, otherwiſe it will undermine the work; and, laſtly, to make the grates of a proper ſtrength, in order to ſupport the preſſure of the water; and yet to uſe no more timber than is neceſſary.

As a general conſtruction is much preferable to a particular one, we ſhall here give the deſcription of a large ſluice, with two pair of gates, from Mr. Muller's Fortification; which may be adapted to any particular caſe, provided a proper allowance be made for the various circumſtances in regard to their uſe and ſituation, as already obſerved.

To conſtruct then the plan of a ſluice, ſuppoſe half its width, O C, (plate CCLII. fig. 1.) to be divided into ſix equal parts; or the whole breadth into twelve: theſe parts ſerve for a ſcale whereby the dimenſions of the ſeveral parts of the work are determined. Through the point O, draw the line A B at right angles to O C, and take O B = 30 of the above parts; or, which is the ſame, equal $2\frac{1}{2}$ the width: through the points A and B, draw the lines A R, B S, at right angles to A B; and let the lines paſſing through the point C, and parallel to A B, meet theſe laſt lines in M and Q: then, if M N and P Q be taken each equal to nine parts, and each of the lines M R and Q S equal to ſix, the lines N R and P S will determine the wings of the ſluice, and N P the body: and if the lines A R, B S, be produced, ſo that the parts R V and S T be each ſix parts, they will determine the faces.

The part of the length, O B, exceeds the other part, O A, by $\frac{1}{4}$ of the width; becauſe we ſuppoſe a turning bridge is to be placed on that ſide, for a communication from one ſide of the ſluice to the other: but when there is no occaſion for ſuch a bridge, O B is made equal to O A; and then the whole length will be but four times and a half the width, which is, Mr. Belidor thinks, the beſt length for a great ſluice.

Next to determine the chamber, and the poſition of the gate, take O D and O L, each equal to four parts; and draw the lines D G and H L parallel to O C: then if the lines G K and H I be drawn, ſo as to make the angles D G K and L H I each = 35° 16′, it will be the beſt poſition that can be given. The cavities *z*, *y*, are a foot each way in large ſluices, and but nine inches in middling ones: they ſerve for letting down ſquare timbers to form a batardeau on each ſide, in caſe the gates or floor want to be repaired.

The receſſes G *a*, H *b*, in the wall, are made to receive the gates when open; and are of ſuch a depth, that they may be fluſh with the wall, and not make that part narrower than the reſt of the ſluice.

The thickneſs of the wall from N to P is equal to $\frac{4}{5}$ of the depth of water; the parts R N and P S are $\frac{3}{5}$, and at V and T $\frac{2}{5}$. The counter-fort W is determined by producing the lines L H and D G, and projects beyond the wall by $\frac{1}{4}$ of the width of the ſluice.

As to the timber-grates under the floor and foundation (*ibid.* fig. 2.) if the foundation be bad, we ſuppoſe piles to be driven under the croſſings of the ſleepers *m* and the tie-beams *n*; and to prevent the water from getting under the foundation, ſix rows of dove-tail piles are driven, *viz.* one at each end, one at each of the angles

angles N and P, marked *p* (*ibid.* fig. 1. and 2.) and one on each fide of the chamber: and it muft be obferved, that excepting thofe at the angles N and P, the reft are all driven between two fleepers in order to keep them tight and clofe together. The fleepers and tie-beams are partly let into each other, and bolted together. And as to the mafonry between the gratings, bricks are preferred to fmall ftones; as being much clofer, and filling up every part more exactly: they are laid in terras-mortar, as well as the reft of the foundation; and the whole is covered with a floor of three-inch thick oaken planks, laid lengthwife. This done, the frames made to fupport the gates at the bottom, are laid in their proper places; which are compofed of a cell *r*, two hurters *s*, two braces *v*, and a tong *t*. The cell enters about three feet into the fide walls, and the fockets to receive the pivots of the gates are placed in it; the tong ought to be fo long as to crofs three fleepers, to which it is ftrongly faftened; and the cell, tong, and hurters ought to have the fame dimenfions; and their height muft be fuch as to be a foot above the laft floor of the fluice and chamber; for which reafon, the piles under the chamber are left a foot higher than the reft.

Over the firft floor is placed another, compofed of fleepers and tie-beams, *&c.* anfwering exactly to thofe underneath, and covered with ftrong oaken planks, laid lengthwife and nailed to the fleeps, as in the firft floor. But upon the fecond floor is laid another of only two-inch thick planks, which do not enter the wall, that they may be repaired when needful: this laft floor may be made of yellow deal, and its feams muft be well caulked, to prevent the water from making its way through them.

The walls muft be made about three feet higher than the greateft depth of the water; and the faces are formed of the largeft ftretchers and heads that can be had, laid in terras-mortar, and cramped together: but the reft of the work may be done with good common mortar. The top of the wall muft be covered with large flat ftones or bricks laid in terras-mortar, to prevent the water from penetrating into the mafonry: and when all is finifhed, a bed of clay fhould be rammed againft the wall, two feet thick, all round the outfide; beginning as low as the foundation, and raifed as high as the wall.

To prevent the water from carrying off the earth, by its fall at the ends of the fluice, a falfe floor of fafcines is made of as many fathoms long as the water in the fluice is feet high: this falfe floor is faftened with pickets upon an artificial bed of clay, nearly level with the floor of the fluice; and above the fafcines is laid a pavement of hard ftones well fecured, fo that the current may not tear them up. And for the greater fecurity a row of dove-tail piles is driven at each end: and it ought to be obferved, that both floors, *viz.* that of the fluices, and that above the fafcines, muft have a gradual defcent about $\frac{1}{48}$ part of the length.

The crofs fection (*ibid.* fig. 3.) fhews the pofition of a row of piles, and the fleepers above them, into which they are tenoned; alfo the heads of the tie-beams, the floor between them, the cell and the two floors above it: there is alfo feen a row of dove-tail piles, broken off in the middle, in order to fee part of the mafonry *a*, *a*, between the piles, and under the fleepers. The outfides of the gates are alfo feen in this fection; alfo how the planks are joined to the frame, the fhutters *x*, *x*, and the irons both of the gate and fhutters.

In the conftruction of gates, particular care fhould be taken to join the feveral pieces together, in fuch a manner, that the whole frame may be as ftrong as poffible, and yet not to make them more heavy than neceffary. The principal parts of the frame of a gate are two ftiles or uprights; that which is next to the wall, and to which the pivots are fixed, being called the pivot-poft, and the other the chamfered ftile, from being edged off fo as to make a plain joint with the other gate. The other pieces, which cannot be feen in this fection, confift of feveral rails, placed not nearer to each other than twenty-four inches, nor farther than thirty; and of feveral braces, which form the fame angle with the pivot-poft, as the joints of the planks on the outfide.

As it would be too tedious to calculate the proper ftrength of each piece, we fhall give their dimenfions from Mr. Belidor, which, he fays, were taken from thofe moft approved in practice. Suppofing then the pieces of the principal frame to be the fame, in the fame fluice, they

they will be as follows in different ſluices. In thoſe from 8 to 12 feet wide, the principal pieces ſhould be 8 inches thick, and 10 broad; the intermediate rails, 6 by 8; the braces and monions, or ſhort uprights to form the wickets, 4 by 6; and the whole covered by two inch thick planks, as well as all the gates of ſluices under 37 feet wide. In ſluices from 13 to 18 feet wide, the principal pieces ſhould be 10 by 12 inches; the intermediate rails, 8 by 10; and the braces and monions, 4 by 6. In ſluices from 19 to 24 feet wide, the principal pieces ſhould be 12 by 14 inches; the intermediate rails, 10 by 12; and the braces and monions, 5 by 7. In ſluices from 25 to 30 feet wide, the principal pieces ſhould be 14 by 16; the intermediate rails, 12 by 13; and the braces and motions 6 by 8. In ſluices from 31 to 36 feet wide, the principal pieces ſhould be 15 by 17, the intermediate rails, 13 by 14; and the braces and monions, 7 by 9. In all ſluices from 37 to 42 feet wide, the principal pieces ſhould be 16 by 18; the rails, 14 by 16; and the braces and monions, 7 by 9. Laſtly, in all ſluices from 42 to 48 feet wide, the principal pieces ſhould be 18 by 20; the rails, 15 by 18; and the braces and monions, 8 by 10. However, it ought to be obſerved, that when the gates are very high, the middle rail is made of the ſame dimenſions with the principal pieces: alſo in ſluices above 36 feet wide, the planks of the gates muſt be 2½ inches thick; or it may anſwer ſtill better, to lay two rows of plank of that thickneſs, in order that the ſeams of the under row may be covered by the planks of the upper one.

Thoſe who deſire to be more particularly informed of the manner of conducting theſe works, agreeably to their ſituation, uſes, and the nature of the ſoil where they are built, may conſult Belidor's Architecture Hydraulique, T. II. P. I. p. 134, ſeq. alſo Mr. Muller's Book, already mentioned, p. 287, ſeq.

SLUTTELBURG, a town of Ruſſia, in the province of Ingria, ſituated on the ſouth-ſide of the lake Ladoga, in eaſt long. 31° 20′, north lat. 60°.

SLUYS, a port-town of dutch Flanders, ſituated oppoſite to the iſland of Cadſant: eaſt long. 3° 15, north lat. 51° 18′.

SMACK, a ſmall veſſel with but one maſt. Sometimes they are employed as tenders on a man of war, and are uſed for fiſhing upon the coaſt, &c. See SHIP.

SMALAND, a province in Sweden, in the territory of Gothland, bounded by Eaſt Gothland, on the north; by the Baltic ſea, on the eaſt; by Blecking, on the ſouth; and by Halland, on the weſt.

SMALKALD, a town of Germany, in the landgraviate of Heſſe, ſituated ten miles ſouth of Saxgotha, near which are conſiderable iron-mines.

SMALLAGE, in botany, a ſpecies of apium. See the article APIUM.

Smallage has the leaves of the ſtalks wedge-like, and is called by authors apium paluſtre, paludapium, and eleoſelinum. It is aperient and diſcuſſive, and its root is one of the five great openers. It is very good in groſs conſtitutions, and infarctions of the lungs, eſpecially if eat with oil and muſtard. There needs no trouble to reduce it into any medicinal form, ſince it may be eaten ſo conveniently and agreeably in ſallads.

SMALT, a preparation of arſenic, made as follows: the remaining matter of the cobalt from which the flowers have been ſublimed being ſuffered to cool, and then taken out of the furnace, is reduced to fine powder, and calcined over again in the ſame furnace, and this repeated till there is not the leaſt particle of flame or ſmoke ſeen to ariſe from any part of it. The cobalt thus freed from its arſenical and ſulphureous part, is then ground to an impalpable powder, and a mixture is made of one hundred pound of this powder, fifty pounds of pure white pot-aſh, and a hundred and fifty pounds of pure white ſand; this is all ground together upon a mill, and then put into a proper furnace, like thoſe of our glaſs-houſes, where it runs into an elegant deep blue glaſs. This is afterwards ground to powder in mills for that purpoſe, and makes what we call ſmalt or powder-blue, uſed by our painters and waſherwomen. It has no uſe in medicine. See the article COBALT.

SMARAGDUS, the EMERALD, in natural hiſtory. See the article EMERALD.

SMARIS, in ichthyology, a ſpecies of the ſparus with a red-ſpot in the middle of each ſide, and with the pectoral fins and tail red. See the article SPARUS.

SMATCH, a bird more uſually called oenanthe. See the article OENANTHE.

SMECTIS, a name by which ſome call fuller's earth. See the article FULLER.

SMELL,

SMELL, *odor*, with regard to the organ, is an impreffion made on the nofe, by little particles continually exhaling from odorous bodies: with regard to the object, it is the figure and difpofition of odorous effluvia, which, ftriking on the organ, excite the fenfe of fmelling: and with regard to the foul, it is the perception of the impreffion of the object on the organ, or the affection in the foul refulting therefrom. See SENSE.

The principal organs of fmelling are the noftrils, and the olfactory nerves; the minute ramifications of which latter are defcribed throughout the whole concave of the former. See the articles NOSE and NERVES.

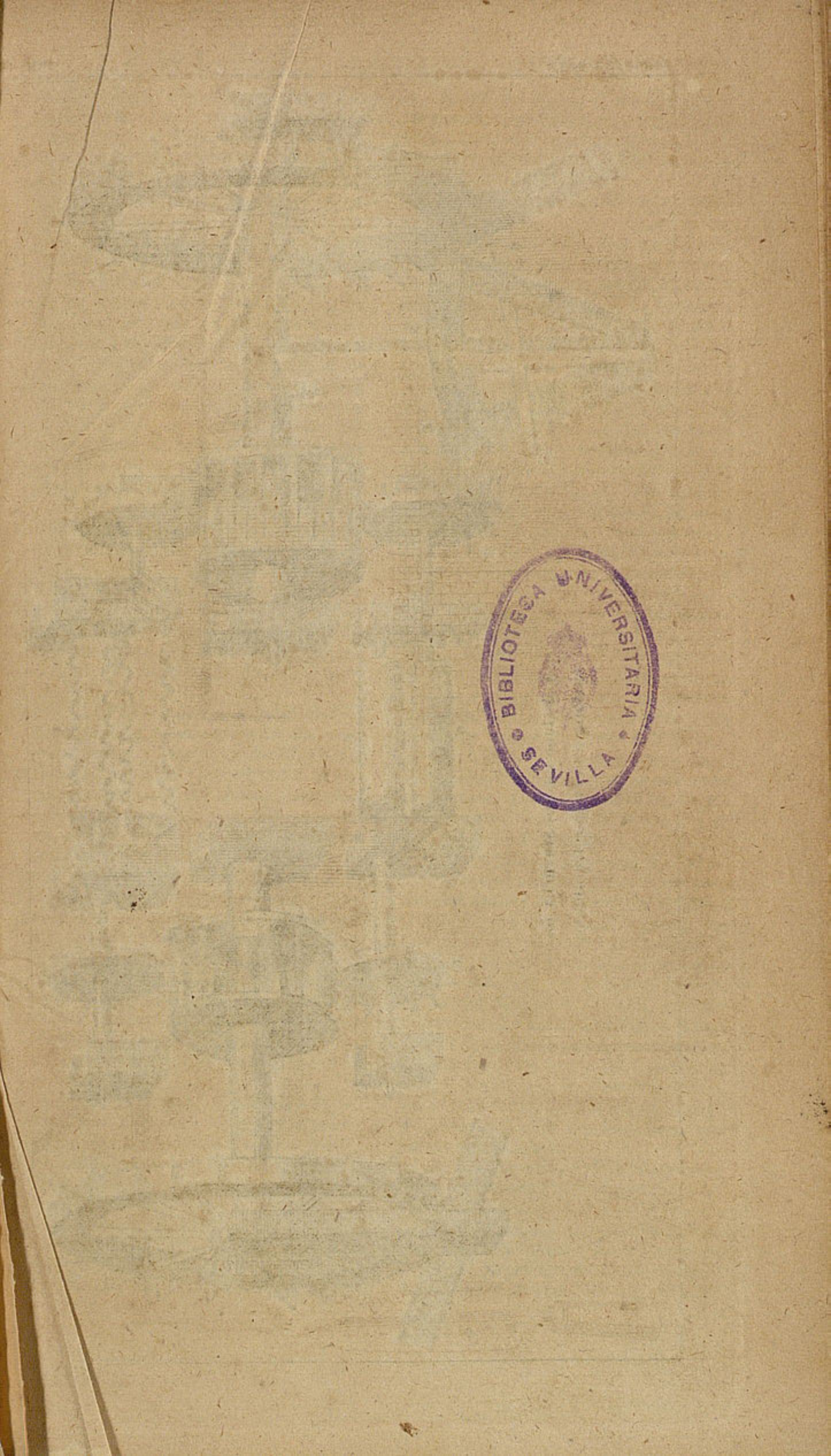
According to Boerhaave, the act of fmelling is performed by means of odorous effluvia, floating in the air, being drawn into the noftrils, in infpiration, and ftruck with fuch force againft the fibrillæ of the olfactory nerves, which the figure of the nofe, and the fituation of the little bones, render oppofite thereto, as to fhake them, and give them a vibratory motion; which action, being communicated thence to the common fenfory, occafions an idea of a fweet, or fœtid, or four, or an aromatic, or a putrified object, *&c.* The matter in animals, vegetables, foffils, *&c.* which chiefly affects the fenfe of fmelling, Boerhaave obferves, is that fubtile fubftance inherent in the oily parts thereof, called fpirit; for that, when this is taken away from the moft fragrant bodies, what remains has fcarce any fmell at all; but this, poured on the moft inodorous bodies, gives them a fragrancy.

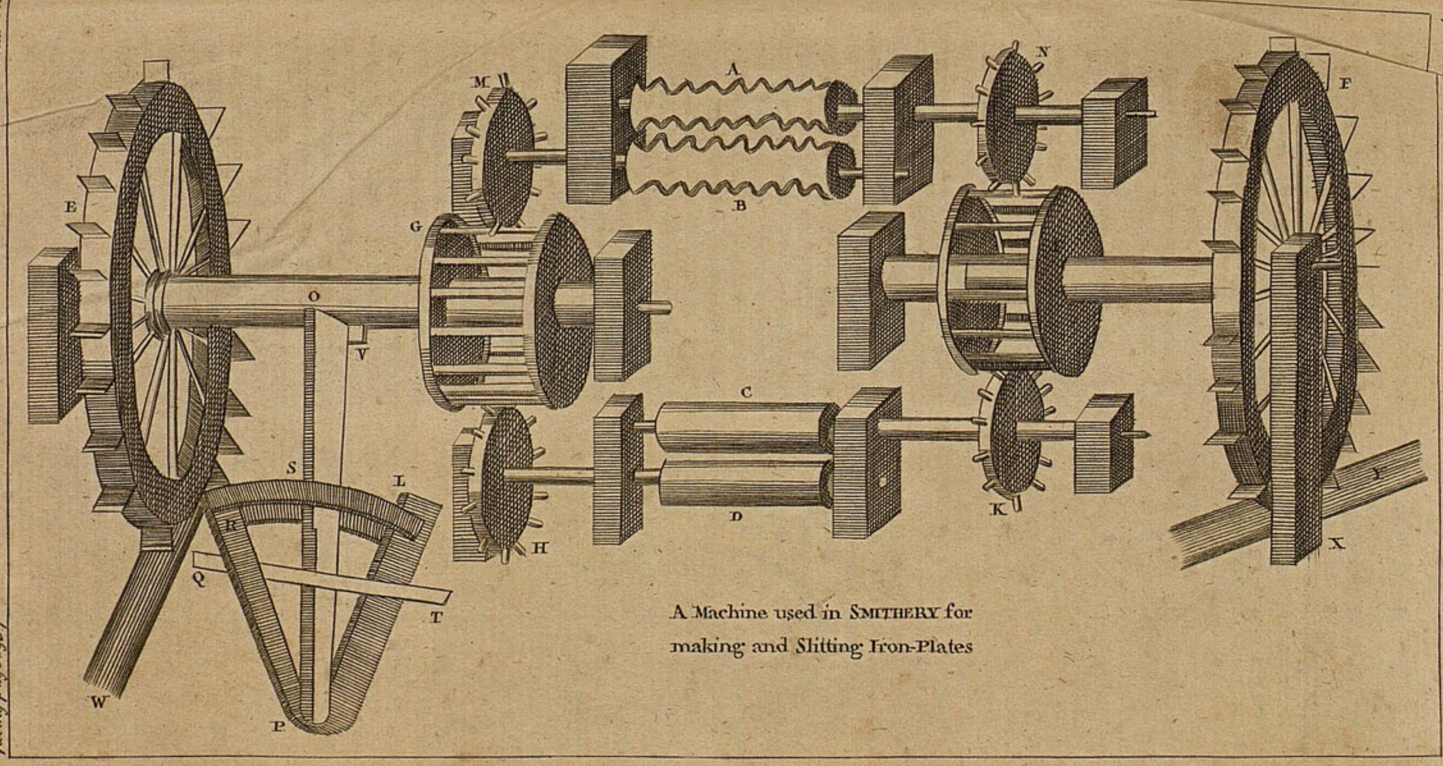
Willis obferves, that brutes have, generally, the fenfe of fmelling in much greater perfection than man; as by this alone, they diftinguifh the virtues and qualities of bodies unknown before; hunt out their food at a great diftance, as hounds, and birds of prey; or hid among other matters, as ducks, *&c.* Man having other means of judging of his food, *&c.* did not need fo much fagacity in his nofe; yet have we inftances of a great deal, even in man. In the Hiftoire des Antilles, we are affured, there are negroes who, by the fmelling alone, can diftinguifh between the footfteps of a Frenchman and a negro.

The chemifts teach, that fulphur is the principle of all fmells, and that thofe are more or lefs ftrong, as the fulphur in the odorous body is more or lefs dried or exalted. Sulphur, they fay, is the foundation of odours, as falt is of favours, and mercury of colours. See the article SULPHUR, *&c.*

Smell, like tafte, confifts altogether in the arrangement, compofition, and figure of the parts, as appears from the following experiments of Mr. Boyle. 1. From a mixture of two bodies, each whereof is of itfelf void of fmell, a very urinous fmell may be drawn, that is, by grinding of quick lime with fal ammoniac. 2. By the admixture of common water, which, of itfelf, is void of all fmell, or inodorous; another inodorous body may be made to emit a very rank fmell. Thus camphor, diffolved in oil of vitriol, is inodorous, yet, mixed with water, immediately exhales a very ftrong fmell. 3. Compound bodies may emit fmells which have no fimilitude to the fmell of the fimples they confift of. Thus oil of turpentine, mixed with a double quantity of oil of vitriol, and diftilled; after diftillation, there is no fmell but of fulphur, and what is left behind, the retort being again urged by a more violent fire, yields a fmell like oil of wax. 4. Several fmells are only to be drawn forth by motion and agitation. Thus glafs, ftones, *&c.* which even when heated yield no fmell, yet, when rubbed and agitated in a peculiar manner, emit a ftrong fmell; particularly beech-wood, in turning, yields a kind of rofy fmell. 5. A body that has a ftrong fmell, by being mixed with an inodorous one, may ceafe to have any fmell at all. Thus if aqua fortis, not well dephlegmated, be poured on falt of tartar, till it ceafes to ferment, the liquor when evaporated will yield inodorous cryftals, much refembling falt of nitre; yet when burnt, will yield a moft noifome fmell. 6. From a mixture of two bodies, one whereof fmells extremely ill, and the other not well, a very pleafant aromatic odour may be gained, *viz.* by a mixture of aqua fortis, or fpirit of nitre, with an inflammable fpirit of wine. 7. Spirits of wine, by mixing with an almoft inodorous body, may gain a very pleafant aromatic fmell. Thus inflammable fpirits of wine, and oil of Dantzic vitriol, mixed in equal portions, then digefted, and at laft diftilled, yield a fpirit of a very fragrant fmell. 8. A moft fragrant body may degenerate into a fœtid one, without the admixture of any other body. Thus, if the fpirit mentioned in the former experiment be kept in a well clofed receiver, it will foon turn

to






A Machine used in SMITHERY for making and Slitting Iron-Plates

to the ranknefs of garlic. 9. From two bodies, one whereof is inodorous and the other fœtid, a very pleafant fmell may arife, much refembling mufk, &c. by putting pearls into fpirit of vitriol; for, when diffolved, they yield a very agreeable fmell.

SMELT, in ichthyology, the ofmerus with feventeen rays in the pinna ani. This is a beautiful little fifh; its length is five or fix inches, and its breadth not great in proportion, but the thicknefs is confiderable: the head is of an oblong figure, and fomewhat acute; the opening of the mouth is large, the back is convex, and the belly fomewhat flat; the lower jaw is a little longer than the upper; the noftrils ftand in the middle between the eyes and the extremity of the roftrum; they have each two apertures; the eyes are large and round, the pupil is black, and the iris of a filvery white, but tinged a little with blue towards the upper part.

SMELTING, in metallurgy, the fufion or melting of the ores of metals, in order to feparate the metalline part from the earthy, ftony, and other parts. See the articles FUSION, ORE, FLUX, GOLD, SILVER, &c.

SMEW, in ornithology, a name ufed in fome parts of the kingdom for the common mergus. See the article MERGUS.

SMILAX, PRICKLY BINDWEED; in botany, a genus of the dioecia-hexandria clafs of plants, without any flower-petals: its fruit is a bilocular berry, with two feeds in each cell.

SMIRIS, in natural hiftory, the fame with emery. See the article EMERY.

SMITHERY, or SMITHING, a manual art, by which an irregular lump of iron is wrought into an intended fhape.

The utenfils, tools, and operations of this art either have been, or will be, defcribed under their refpective articles FORGE, ANVIL, HAMMER, VICE, FILING, CASE-HARDENING, NEALING, SOLDERING, &c.

In the annexed plate (CCLIII.) fig. 1. reprefents the fmith's forge and bellows; fig. 2. the anvil fet in a wooden block, its face being A, and B its beak or beak-iron, corruptly called bickern; fig. 3. and 4. two kinds of tongs, where A, A are the chaps, B the joint, and C, C the handles; fig. 5. reprefents two kinds of hammer, of which B is the pen, and D the handle; fig. 6. is the vice, of which A, A are the chaps, C the fcrew-pin, D the nut, E the fpring, and F the foot; G is a hand-vice; and H, H the pliers; fig. 7. is the fcrew-plate and its tap; and fig. 8. a drill.

Thefe are the moft effential tools ufed in the black-fmith's trade; however, as fome kinds of work require different tools, we fhall here defcribe a machine for iron-work. AB (plate CCLIV.) is called the flitting mill, CD the plate-mill, and SP the clipping-mill. E and F are two great water-wheels, fo difpofed that when the water has paffed the wheel E in the direction QW, it comes about the wheel F in the direction XY. The water-wheel E, with the lantern G on the fame axis, carries the fpur-wheels, or cog-wheels, H, M, with the cylinders B and D: and the wheel F, with the lantern I, carries the cog-wheels K, N, with the cylinders A and C. Now the cylinders A and B, as alfo C and D, turn contrary ways about; the cylinders A and B are cut into teeth for flitting iron-bars, and are about twelve inches in diameter, whereas C and D are only eight inches in diameter. Thefe cylinders may be taken out, and others put in at pleafure; they may alfo be brought nearer to, or removed farther from, each other, by means of fcrews which fcrew up the fockets where their axles turn. The axles of N, I, K, lie all in one horizontal plane; and fo do thofe of M, G, H: but the cylinders A and B, as alfo C and D, lie one above another.

In order to make iron-plates, if a bar of iron be heated and made thin at the end, and that end put in between the cylinders C and D, whilft the mill is going, the motion of the cylinders will draw it through, on the other fide, into a thin plate. Likewife, if a bar of iron be heated and thinned at the end, and put in between the toothed cylinders A and B, it will be drawn through on the other fide, and flit into feveral fmall pieces, or ftrings; and then, if there be occafion, any of thefe ftrings may be drawn through the plate mill with the fame heat, and fafhioned into plates.

In the clipping-mill, OPQ (*ibid*) is the fheers for clipping bars of cold iron; V, a cog in the axis of the water-wheel; OP, one fide of the fheers made of fteel, and moveable about P. The plane LPR is perpendicular to the horizon. When the mill goes, the cog V raifes the

the side O P, which as it rises, clips the bar T Q into two, by the edges S P and R P.

The whole of this engine, except the water-wheels, is within the house.

SMOKE, or SMOAK, *fumus*, an humid matter, exhaled in the form of vapour, by the action of fire or heat. See FIRE, HEAT, and EXHALATION.

SMOKE-JACK, (plate CCLV. fig. 1.) is a very simple and commodious machine, in a kitchen; so called from its being moved by means of the smoke, or rarified air, moving up the chimney, and striking against the tail of the horizontal wheel, A B; which being inclined to the horizon, is thereby moved about the azis of the wheel, together with the pinion C, which carries the wheel D and E; and E carries the chain F, which turns the spit.

The wheel A B should be placed in the narrow part of the chimney, where the motion of the smoke is swiftest, and the greatest part of it must strike upon the sails. The force of this machine is so much greater, as the fire is greater.

SMOKE SILVER, and SMOKE-PENNY, a payment made to the ministers of several parishes in lieu of tythe-wood.

SMOLENSKO, the capital of a province of the same name, in Muscovy, situated on the confines of Poland, in east long. 33°, and north lat. 56°.

SMUGGLERS, in law, those persons who conceal or run prohibited goods, or goods that have not paid his Majesty's customs. See DUTY, CUSTOMS, *&c.*

SMUT, in husbandry, a disease in corn, when the grains, instead of being filled with flour, are full of a stinking black powder.

As to the cause of this distemperature, some have attributed it to excessive rankness, or fatness of the soil; to the manuring the land with rotten vegetables, and to the sowing smutty seed. Mr. Bradley thinks it is owing to the same cause with a blight, *viz.* to multitudes of insects. But Mr. Tull is convinced, from experiment, that it is caused by too much moisture; for planting several plants of corn in troughs of very moist earth, they all produced smutty ears, while very few such were found in the field, from whence these plants were taken.

There are two remedies for the smut, recommended by writers on husbandry; *viz.* steeping the seed in salt brine, and changing the seed. See the articles SEED and CHANGE *of Seed.*

As to the steeping of seed, when wheat is intended for drilling, it must be soaked in a brine of pure salt, dissolved in water, since urine is found to be highly prejudicial. The most expeditious way of brining wheat for drilling, is to lay it in a heap, and wash it with a strong brine sprinkled on it, stirring it up with a shovel, that it may be all equally brined, or wetted with it; after this, sift on some fine lime all over the surface, and stir it up, still sifting on more in the same manner till the whole is dusted with the lime, it will then be soon dry enough to be drilled without farther trouble. It must be quick-lime, in its full strength, that is used on this occasion.

The bread made of smutty corn, is very pernicious, acting as a narcotic, and occasioning not only sleepiness, but vertigoes and even convulsions.

SMYRNA, a city and port-town of asiatic Turky, situated on a bay of the Archipelago, in the province of Ionia, in lesser Asia, a hundred miles north of Rhodes, and two hundred miles nearly south of Constantinople: east long. 27°, north lat. 37° 30′.

SMYRNIUM, ALEXANDERS, in botany, a genus of the pentandria-digynia class of plants, with an umbelliferous compound flower, made up of lesser rosaceous ones, with five lanceolated petals: the fruit is naked, sub-globose, striated, and separable into two parts; and the seeds are two, lunulated, convex on one side, with three striæ, and plane on the other.

The leaves, roots, and seeds of this plant are used in medicine; its virtues being the same with those of smallage, only in a somewhat stronger degree.

SNAFFLE, in the manege, is a very slender bit-mouth, without any branches, much used in England; the true bridles being reserved for the service of war.

The snaffle, or small watering-bit, is commonly a scatch-mouth, with two very little, straight branches, and a curb, mounted with a headstall, and two long reins.

SNAIL, *limax*, in zoology, a genus of the gymnarthria, or naked insects, the body of which is of a figure approaching to cylindric, and is perforated at the side: the

Fig. 1. A Smoke-Jack

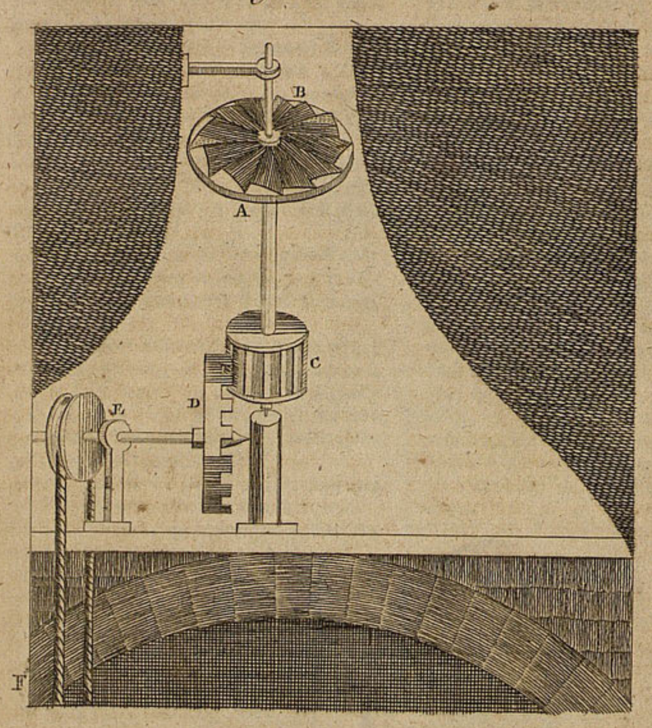



Fig. 2. Snails

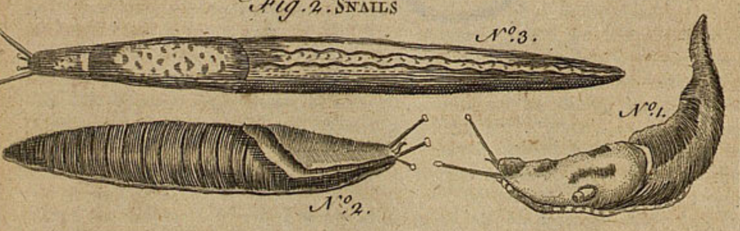
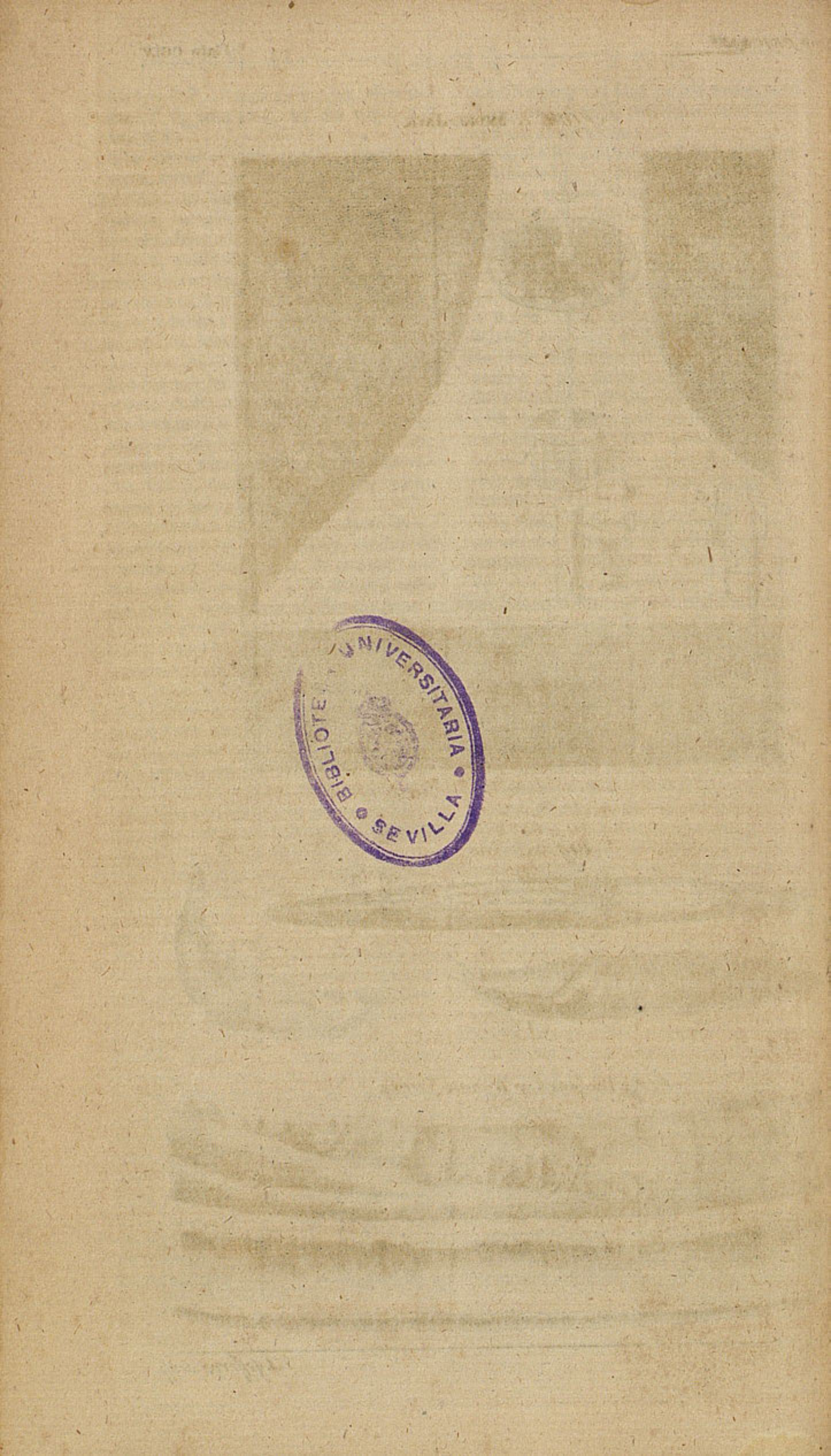



Fig. 3. The Solen, or Razor-Shell



T. Jefferys sculp.



the tentacula, or horns, as they are called, are four in number, and two of them have the appearance of eyes.

There are a great many species of snails, whereof we shall only mention a few. 1. The black naked snail, a considerably large insect, being commonly three inches long, and half an inch broad; its whole body is furrowed and much wrinkled, and is of a deep black, except the belly, which is grey. See plate CCLV. fig. 2. n° 1.

2. The naked reddish snail grows only to about two inches in length, and is also covered with numerous slight furrows. *ibid.* n° 2.

3. The amber-coloured snail, (*ibid.* n° 3.) when full grown, is only about an inch and a half long: its colour is a glossy yellow, with a cast of brown in it, and the whole body is variegated with spots of a greyish colour.

Snails are all hermaphrodites, and are esteemed provocatives by the Asiatics.

SNAKE, *anguis*, in zoology. See the article ANGUIS.

The common snake is a harmless and inoffensive animal, and might even be kept tame in houses to destroy vermin. Its flesh is restorative, like that of the viper. See the article VIPER.

For the blood-snake, rattle-snake, &c. see the articles HÆMORRHUS, RATTLE-SNAKE, &c.

SNAKE-ROOT, *serpentaria*, in botany, a species of polygala. See POLYGALA.

SNAKE-STONE, a name given to the ammonitæ. See AMMONITÆ.

SNAKE-WEED, in botany, the same with bistort. See the article BISTORT.

SNAPDRAGON, *antirrhinum*, in botany, a genus of the didynamia angiospermia class of plants, with a monopetalous personated flower, divided into two lips; the upper one of which is bifid, and the lower one trifid: the fruit is a roundish bilocular capsule, containing a great many kidney-shaped seeds.

This genus comprehends also the linaria, or toad-flax, the asarina, elatine, and cymbalaria of authors.

SNATCH BLOCK, among sea-men, a kind of pulley. See PULLEY.

SNEEK, a town of Friesland, in the United Provinces, twelve miles south of Lewarden.

SNEEZING, *sternutatio*, a convulsive motion of the muscles of the breast, whereby the air is expelled from the nose, with much vehemence and noise.

Sneezing is caused by the irritation of the upper membrane of the nose, occasioned by acrid substances floating in the air, or by medicines called sternutatories. See SNUFF and STERNUTATIVE.

SNETHAM, a market-town of Norfolk, twenty-eight miles north-west of Norwich.

SNIATIN, a town of Red Russia, in Poland, on the confines of Moldavia: east long. 25° 20′, north lat. 48°.

SNIGGLING, a method of catching eels, when they hide themselves in holes: it is performed by thrusting a baited hook and strong line into the holes where they are supposed to lie concealed; and if there be any, they will certainly bite; so that if the tackling hold, the largest eels may be thus taken.

SNIPE, in ornithology, a species of numenius, with four brown streaks on the head; it is a small but beautiful bird, and its flesh is delicate, and much esteemed at table.

SNOUT, or CALF'S-SNOUT, in botany, the same with snapdragon. See the article SNAPDRAGON.

SNOW, *nix*, in meteorology, a meteor produced in this manner: when the vapours are become considerably condensed, yet not so far as to be liquified, or dissolved into water; then by a special degree of coldness in the upper region of the air, the particles of the condensed vapour are changed into ice; several of which adhering together, form little fleeces of a white substance, somewhat heavier than the air; and therefore descend in a slow and gentle manner thro' it; being subject, by reason of its lightness, to be driven about by the various motions of the air, and wind; and is what, when arrived to the surface of the earth, we call snow. See FROST, HAIL, &c.

The use of snow must be very great, if all be true Bartholin has said in its behalf, in an express treatise, *De nivis usu medico*; he there shews, that it fructifies the earth (which, indeed, is a very old and general opinion) preserves from the plague, cures fevers, cholics, toothachs, sore eyes, and pleurisies (for which last use, his countrymen of Denmark use to keep snow-water gathered in March.) He adds, that it contributes to the prolongation of life; giving instances of people in the Alpine mountains that live to great ages; and to the preserving dead bodies, instances whereof he gives in persons buried under the snow in passing the

the Alps, which are found uncorrupted in the ſummer, when the ſnow is melted. He obſerves, that, in Norway, ſnow-water is not only their ſole drink in the winter, but ſnow even ſerves for food; people having been known to live ſeveral days, without any other ſuſtenance.

Indeed the generality of theſe medicinal effects of ſnow are not to be aſcribed to any ſpecific virtue in ſnow, but to other cauſes. It fructifies the ground, for inſtance, by guarding the corn or other vegetables, from the intenſer cold of the air, eſpecially the cold piercing winds. And it preſerves dead bodies, by conſtipating and binding up the parts, and thus preventing all ſuch fermentations or internal conflicts of their particles, as would produce putrefaction.

Snow may be preſerved by ramming it down in a dry place, under-ground, and covering it with chaff, in the manner of ice. See the article ICE.

SNOWDON HILL, the higheſt mountain in Wales, ſituated in Carnarvonſhire.

SNOW-DROP, in botany, the Engliſh name of the galanthus. See GALANTHUS.

SNOWDROP-TREE, the ſame with the chionanthus. See CHIONANTHUS.

SNUFF, a powder chiefly made of tobacco, the uſe of which is too well known to need any deſcription here. See the article TOBACCO.

However though tobacco be the baſis of ſnuff, yet a multiplicity of other matters are often added, to give it an agreeable ſcent.

The kinds of ſnuff being endleſs, we ſhall only obſerve, that there are three grand ſorts, *viz.* that which is only granulated, and called rappee; that which is reduced to a very fine powder, and called ſcotch, ſpaniſh, *&c.* ſnuff; and the third, a coarſe kind, remaining after ſifting the ſecond ſort.

SOAL-FISH, *ſolea*, in ichthyology, the engliſh name of the long-bodied pleuronectes, with rough ſcales on both ſides. See PLEURONECTES.

This is a fiſh deſervedly held in great eſteem at table: its uſual length is from five, or ſix, to fourteen inches in length; it is of an oblong elliptical figure, and thin in proportion to its other dimenſions: its eyes are not protuberant, but are placed at a greater diſtance than in moſt other ſpecies, and both on the left ſide.

SOAP, or SOPE, in commerce, and the manufactures, a kind of paſte, ſometimes hard and dry, and ſometimes ſoft and liquid, much uſed in waſhing, whitening linens, and by dyers, fullers, *&c.*

The principal ſoaps of our manufacture, are the ſoft, the hard, and the bale ſoap; all which conſiſt of an intimate union of the ſalt of pot-aſh, with oil, or animal-fat.

1. The ſoft ſoap is either green or white. The principal ingredients in the green-kind are lyes drawn from pot-aſhes, and lime boiled up with tallow and oil. Firſt, the lye and tallow are put into the copper together, and when melted, the oil is put to them, and the copper made to boil; then they damp or ſtop up the fire, while the ingredients remain in the copper to knit or incorporate; which being done, they ſet the copper a boiling again, feeding or filling it with lyes as it boils, 'till they have put in a ſufficient quantity; after which they boil it off with all convenient ſpeed, and put it into barrels.

One ſort of white ſoap is made after the ſame manner with green ſoap; excepting that they do not uſe any oil in this. Another ſort of white ſoft ſoap is made from lyes of aſhes of lime, boiled up twice with tallow. Firſt they put a quantity of lyes and tallow into the copper together, which is kept boiling, being fed with lyes as it boils, till it is boiled enough, or that they find it grains; then they ſeparate or diſcharge the lyes from the tallowiſh part, which they put into a tub, throwing away the lye; this they call the firſt half-boil. Then they charge the copper again with freſh tallow and lye, and put the firſt half-boil out of the tub into the copper a ſecond time, and keep it boiling with freſh lye and tallow, till it is brought to perfection, and afterwards filled out into ſoap-caſks.

2. Hard ſoap is made of aſhes and tallow, and commonly boiled at twice; the firſt boiling they alſo call a half-boiling, which is performed exactly after the ſame manner as the firſt half-boil of the ſoft white ſoap. Then they charge the copper again with freſh lye, and put into it the firſt half-boil again, feeding it with lye, as it boils, till it is boiled enough, or till it grains; then they diſcharge the lye from it, and put the ſoap into a frame to boil and harden.

3. Ball-ſoap is made alſo of lye from aſhes and tallow; they put the lye into the

the copper, and boil it till the watery part is quite gone, and there is nothing left in the copper but a fort of nitrous matter (which is the very ftrength and effence of the lye) then they put tallow to it, and keep the copper boiling and ftirring for half an hour or more, in which time the foap is compleated, which they put into tubs or bafkets with fheets in them, and immediately (while foft) make it into balls.

It takes up near twenty-four hours to boil away the watery part of the lye.

The procefs of foap-boiling, as at prefent practifed, being a very tedious, as well as expenfive, operation, Dr. Shaw propofes a method to fhorten it, by fubftituting motion in the place of fire: this motion might be eafily given, by an engine, to any quantities of the ingredients at a time; and that fuch a method is effectual for making foap, the doctor proved by the following experiment: he mixed, in a large phial, half a pint of foap-lye, with an ounce, or more, of oil-olive; and fhaking thefe together, for a quarter of an hour, a true cake of foap was obtained on the top of the liquor, which hardened on being expofed to the air.

SOAP, *fapo*, in medicine. The purer hard foap is the only fort intended for internal ufe; this, triturated with oily or refinous matters, renders them foluble in water; and hence becomes an ingredient in pills compofed of refins, promoting their diffolution in the ftomach, and union with the animal fluids. Boerhaave always prefcribed foap in refinous pills, unlefs where an alkalefcent or putrid ftate of the juices forbad its ufe. From the fame quality, foap feems well fitted for diffolving oily or unctuous matters and vifcidities in the human body; thereby opening obftructions, and deterging all the veffels it paffes through. It is likewife a powerful menftruum for the calculus, or ftone in the bladder; a folution of it in lime-water being one of the ftrongeft diffolvents that can with fafety be taken into the ftomach: the virtue of this compofition is confiderably greater than the aggregate of the diffolving powers of the foap and lime-water, when unmixed. See the articles LIME, and LITHONTRIPTICS.

The foft foaps are more penetrating and acrimonious than the hard, and are therefore only ufed externally.

The proper menftruum of foap is a proof fpirit, freed from its acid; this diffolves it the moft perfectly, and in the greateft quantity, three ounces taking up one or more; and in this form, foap may, in fome cafes, be conveniently exhibited.

To purify foap for medicinal ufe, flice it into a clean pewter veffel, and pour upon it two gallons of rectified fpirit of wine: place the veffel in a bath-heat, and increafe the fire fo as to make the fpirit boil, and it will foon diffolve the foap. Let the veffel ftand clofe covered in a warm place, till the liquor has grown perfectly clear; and, if any oily matter fwim upon the furface, fcum it off; then decant the limpid liquor, and diftill off from it all the fpirit that will arife in the heat of a water-bath. Expofe the remainder to a dry air, for a few days, and it will become a white, opake, and fomewhat friable mafs, not in any degree acrimonious, and confequently well fitted for medicinal purpofes.

There are alfo feveral other faponaceous medicines, as foap of almonds, of tartar, &c. See ALMOND, &c.

SOAP-EARTH, or SOAP-ROCK, in natural hiftory. See STEATITES.

SOAR-HAWK, an appellation given to an hawk, from the time of taking her from the eyrie, till fhe has mewed, or caft her feathers.

SOC, or SOK, *foca*, in law-books, denotes jurifdiction. See JURISDICTION.

SOCAGE, an antient tenure, by which lands were held on condition of ploughing the lord's lands, and doing the operations of hufbandry, at their own charges. See TENURE.

SOCO, in ornithology, the ferrugineous ardea variegated with black. See the article ARDEA.

This is nearly of the fize of our common heron, but the body is fmaller in proportion to the length of the neck and legs; the head is large, and of an oblong figure, narroweft at the front, and broader behind; the beak is five inches long, and of a greenifh olive-colour; the eyes are large, their iris yellow, the head is a deep brown, has no creft, and very little of the black variegation.

SOCCUS, in antiquity, a kind of high-fhoe, reaching above the ancle, worn by comedians, as the cothurnus was by tragedians.

SOCIETY, *focietas*, in general, denotes a number of perfons united together for

their mutual assistance, security, interest, or entertainment.

The social principle in man is of such an expansive nature, that it cannot be confined within the circuit of a family, of friends, or a neighbourhood: it spreads into wider systems, and draws men into larger communities and common-wealths; since it is in these only, that the more sublime powers of our nature attain the highest improvement and perfection of which they are capable.

In society, the mutual aids, which men give and receive, shorten the labours of each; and the combined strength and reason of individuals give security and protection to the whole body. There is a variety of genius among mankind; some being formed to lead and direct others, to contrive plans of employment for individuals, and of government for communities, to invent laws and arts, and superintend their execution, and in short to refine and civilize human life: others again, who have not such good heads, may have honest hearts, a true public spirit, love of liberty, order, *&c.* and finally, others seem best disposed for manual exercises, as bodily labour. Society finds proper employment for every genius, and the noblest objects and exercises for the noblest geniuses. In society, a man not only finds more leisure, but better opportunities of applying his talents with success.

From this short detail it appears, that man was formed for society; which rests on these two principal pillars. 1. That it afford security against those evils, which are unavoidable in solitude. 2. That it enables us to obtain those goods, some of which cannot be obtained at all, and others not so well, in a state of solitude, wherein men depend wholly on their own sagacity and industry. See GOVERNMENT and LAW.

*Royal* SOCIETY, an academy, or college, established by charter, by king Charles II. for promoting natural knowledge, and useful arts, by experiments. See the article ACADEMY.

It consists of several hundred fellows, or members, mostly british; some persons of the highest rank, and many eminent gentlemen and learned men of other nations. Their meetings are held once a week, at their house in Crane-Court, Fleet-Street, London; where they discourse upon the productions and rarities of nature and art, and consider how the same may be improved for the good of mankind: here are also read letters, and other philosophical papers, sent by ingenious persons, both at home and abroad; upon which they discourse in the plainest manner, without affecting studied speeches. See *Philosophical* TRANSACTIONS.

This society, of which his britannic majesty is perpetual patron, is governed by a council of twenty-one members, ten of whom are yearly chosen out of the society, on St. Andrew's-day: the chief of the council bears the title of president, whose proper office is to call and dissolve the meetings, to propose the matter to be debated, call for experiments, and admit such members as shall be elected, which must be by a majority of at least twenty-one votes: whereupon he is admitted, after paying 40 s. and subscribing, That he will endeavour to promote the good of the Royal Society of London, by the improvement of natural knowledge; and being thus admitted, he afterwards pays 13 s. a quarter, as long as he continues a member of the society.

SOCIETY *for the encouragement of arts, manufactures, and commerce.* The public spirit of this age is no where more remarkably shewn, than in the flourishing condition of this valuable society, whose object is the improvement of the polite, useful, and commercial arts, in all their various branches, by exciting industry and emulation among all who can be stimulated by honourary or pecuniary rewards. It was set on foot in the year 1753, by the lord Folkstone, lord Romney, Dr. Hales, and seven or eight private gentlemen, who were brought together by the unwearied pains of Mr. William Shipley, who had long laboured to reduce into practice a scheme he had formed for this purpose. This society at their second meeting determined to make a beginning, by proposing rewards for the discovery of cobalt, for the encouragement of boys and girls in the art of drawing, and for the planting of madder in this kingdom. And now money being wanted, a voluntary subscription was begun, soon after which a plan was drawn up for forming, regulating, and governing the society; and now the utility of such a society became so well understood, that immediately several noblemen and gentlemen offered them-

themfelves as members, and ever fince that time, its increafe has been fo extraordinary, that it confifts of feveral thoufand members, among whom are moft of the nobility, and perfons of large fortunes in the kingdom. The officers of this fociety are a prefident, eight vice-prefidents, a regifter, a fecretary and an affiftant fecretary, who are all chofen by ballot annually, on the firft Tuefday in March. Every perfon, defiring to be a member of this fociety, muft be propofed by three members; his name, addition, and place of abode being read aloud by the fecretary, he is ballotted for at the next meeting; he fhall be deemed a perpetual member upon payment of twenty guineas, or a fubfcribing member upon payment of any fum not lefs than two guineas annually. Ladies are alfo admitted members, and foreigners are likewife admitted as honourary or correfponding members. The money of the fociety is placed in the bank of England, in the name of the prefident and vice-prefidents, three of whom are empowered to draw any fum the fociety fhall order to be paid. The fociety's office is oppofite to Beauford Buildings in the Strand, in London, where their meetings are held every Wednefday evening, from the fecond Wednefday in November, to the laft Wednefday in May, and at other times, every firft and third Wednefday of every month.

Society *for the reformation of manners*, and putting in execution the laws againft immorality and profanenefs. It was fet on foot, about forty years ago, by five or fix private perfons in London, but is fince exceedingly increafed by numbers of all denominations. A particular body of the moft confiderable hereof bear the expence of profecutions, &c. without any contribution from the reft. Thefe chiefly apply themfelves to the profecuting people for fwearing, drunkennefs, and prophaning the fabbath. Another body, of about fifty perfons, apply themfelves to the fuppreffing lewdnefs, and by them above five hundred lewd houfes have been actually fuppreffed; a third body confifts of conftables; and a fourth of informers. Befides thefe, are eight other regular mixed bodies of houfe-keepers and officers, who infpect the behaviour of the conftables and other officers, affift in fearching diforderly houfes, feizing offenders, giving information, &c. There are feveral other focieties of this kind at Briftol, Canterbury, Nottingham, &c.

Society *for propagating the gofpel in foreign parts*, was inftituted by king William, in 1701, for fecuring a maintenance for an orthodox clergy, and making other provifions for the propagation of the gofpel in the plantations, colonies, frontiers, &c. To that end he incorporated the archbifhops, feveral bifhops, and other nobility, gentry, and clergy, to the number of ninety, with privilege to purchafe two thoufand pounds, per year, inheritance and eftates for lives, or years, with other goods, to any value. They meet yearly on the third Friday in February, to chufe a prefident, vice-prefident, and other officers; and the third Friday in every month to tranfact bufinefs, depute fit perfons to take fubfcriptions for the faid ufes, and of all monies fo received to give account to the lord chancellor, &c. They have a ftanding committee at the chapter-houfe, to prepare matters for the monthly meeting which is held at St. Martin's library.

Society *for propagating chriftian knowledge*. This was begun in 1699, by fome perfons of worth, &c. Its original defign was to propagate religion in the plantations, to fecure the pious education of the poor at home, and to reclaim thofe that err in the fundamentals of chriftianity. In the year 1701, they had procured confiderable charities, and tranfmitted the fame to the plantations, in libraries, bibles, catechifms, &c. with a voluntary maintenance for feveral minifters to be employed in the plantations; but the fociety for propagating the gofpel in foreign parts being then inftituted, they were incorporated by charter in the fame, and thus difcharged as a particular fociety from the further purfuit of that branch of their original defign, whereupon they wholly turned themfelves to the other, and are now very confiderable by great acceffions from the clergy and laity. They meet weekly to concert meafures for raifing charity for educating poor children, and fetting up fchools for that purpofe, as alfo for the more regular difpofal of books for the inftruction of the ignorant, erroneous, &c.

For the other focieties eftablifhed by charter, fee the articles College, Company, and Corporation.

Society, in a commercial fenfe, the fame with partnerfhip or fellowfhip. See Partnership and Fellowship.

SOCINIANS, in church hiftory, a fect of chriftian

christian heretics, so called from their founder Faustus Socinus, a native of Sienna, in Italy. He, about the year 1574, began openly to declare against the catholic faith, and taught, 1. That the eternal father was the one only God; that the word was no more than an expression of the godhead, and had not existed from all eternity; and that Jesus Christ was God no otherwise than by his superiority above all creatures who were put in subjection to him by the Father. 2. That Jesus Christ was not a mediator between God and men, but sent into the world to serve as a pattern of their conduct; and that he ascended up to heaven only as it were to take a journey thither. 3. That the punishment of hell will last but for a certain time, after which the body and soul will be destroyed. And, 4. That it is not lawful for princes to make war. These four tenets were what Socinus defended with the greatest zeal. In other matters, he was a lutheran or a calvinist; and the truth is, that he did but refine upon the errors of all the antitrinitarians that went before him. The socinians spread extremely in Poland, Lithuania, and Transylvania. Their sentiments are explained at large in their catechism, printed several times under the title of Catechesis Ecclesiarum Polonicarum, unum Deum Patrem, illiusque filium unigenitum, una cum Sancto Spiritu, ex sacra scriptura confitentium. They were exterminated out of Poland in 1655, since which time they have been chiefly sheltered in Holland, where though their public meetings have been prohibited, they find means to conceal themselves under the names of arminians and anabaptists. See the article ARMINIANS.

SOCKAGE, or SOCAGE. See SOCAGE.

SOCKET, BALL AND SOCKET. See BALL.

SOCKETS in a ship, are the holes which the pintles of the murthering pieces go into.

SOCLE, or ZOCLE, in architecture, a flat square member under the bases of pedestals of statues, vases, &c. which serves as a foot or stand. Continued socle is a kind of continued stand or pedestal without either base or corniche, ranging round the whole building, called by Vitruvius stereobata.

SOCMEN, or SOKEMEN, such tenants as held their lands and tenements in socage; but the tenants in antient demesne, seem most properly to be called socmans. See the article SOCAGE.

SOCNA, in our old writers, denotes some privilege, liberty, or franchise.

SOCOME, is taken for a custom of grinding corn at the lord's mill; whence came the name or term of bond socome, by which the tenants were bound to it; and also love socome, where they did it voluntarily out of love to their lord.

SOCONUSCO, a port-town of Mexico, in North America, capital of the province of that name, situated on the Pacific ocean: west long. 98°, north lat. 15°.

SOCOTORA, an island in the indian ocean, about seventy miles long, and fifty broad, situated in east long. 53°, north lat. 11°.

SOCRATIC PHILOSOPHY, the doctrines and opinions, with regard to morality and religion, maintained and taught by Socrates. By the character of Socrates, left us by the antients, particularly by his scholar Plato, Laertius, &c. he appears to have been one of the best and the wisest persons in all the heathen world. To him is ascribed the first introducing of moral philosophy, which is what is meant by that usual saying, "That Socrates first called philosophy down from heaven to earth;" that is, from the contemplation of the heavens and heavenly bodies, he led men to consider themselves, their own passions, opinions, faculties, duties, actions, &c. He wrote nothing himself, yet all the grecian sects of philosophers refer their origin to his discipline, particularly the platonists, peripatetics, academics, cyrenaics, stoics, &c. but the greatest part of his philosophy we have in the works of Plato. See the article PLATONISM, &c.

SODA, or HEAT *of the stomach*, in medicine, the name of a distemper consisting in a heat or troublesome burning about the pit of the stomach, or its left mouth, which sometimes is extended the whole length of the oesophagus, with a pressure or spasmodic constriction, usually attacking the patient by fits. The cause is generally fat aliment, especially veal, if cold drink be taken soon after. In some it proceeds from acids, in others from aromatics, spirituous liquors, or bilious humours. This disorder is generally slight, and vanishes of its own accord, though in others it is of long duration. In the cure, the cause must always be attended to; if from acids, absorbents are proper, particularly crabs-eyes and prepared shells, mixed with a fourth or fifth part of powder of nutmeg given

given to half a dram, as alſo the tabellæ cardialgicæ. It is common to take chalk alone or mixed with nutmeg; but care ſhould be taken not to be too free in its uſe. Oil of tartar per deliquium, given from twenty to thirty drops in coffee, tea, broth, or warm beer, is generally efficacious, as alſo tincture of tartar and ſpirit of hartſhorn. If it proceeds from bilious humours, thirty or fifty drops of dulcified ſpirit of nitre in water, tea, or coffee, will take away the pain. When it is cauſed by fat things and draughts of cold liquor, a dram of brandy is good. Now and then laxatives ſhould be given to carry off the humours. In ſanguine conſtitutions, bleeding may be proper.

SODA *ſubithica*, among the antient phyſicians, was a term whereby they expreſſed a peculiarly ſharp and terrible pain of the head.

SODBURY, a market-town of Glouceſterſhire, ſituated ten miles north-eaſt of Briſtol.

SODDER, or SOLDER. See SOLDER.

SODOM RUINS, are ſaid to be ſometimes ſeen at the bottom of the lake called the Dead ſea, in Paleſtine: eaſt long. 38°, north lat. 31° 40′.

SODOMY, the unnatural crime of buggery, thus called from the city of Sodom, which was deſtroyed by fire for the ſame. The levitical law adjudged thoſe guilty of this execrable crime to death, and the civil law aſſigns the ſame puniſhment to it. Our law alſo makes it felony. See the article BUGGERY.

There is no ſtatute in Scotland againſt ſodomy; the libel of this crime is therefore founded on the divine law, and practice makes its puniſhment to be burning alive.

SOFA, in the turkiſh cuſtoms, a bench of wood raiſed from the ground about a foot high, and placed round a hall or chamber for the people to ſit down upon, or to lie along, and in that poſture to take a view of what paſſes in the ſtreets, &c. for theſe benches are ſurrounded with windows; they are covered with fine turky carpets; and upon that are placed cuſhions of ſattin flowered with gold, or ſome other rich ſtuff.

SOFALA, the capital of the territory of that name in Africa, ſituated at the mouth of the river Sofala, in eaſt long. 35°, ſouth lat. 20°.

SOFFITA, or SOFFIT, in architecture, any plafond or ceiling formed of croſs beams of flying corniches, the ſquare compartiments or pannels of which are enriched with ſculpture, painting or gilding; ſuch are thoſe in the palaces of Italy, and in the apartments of Luxembourg at Paris. This word is particularly uſed for the under ſide or face of an architrave, and for that of the corona, or larmier, which the antients called lacunar, the French plafond, and we uſually the drip. It is enriched with compartiments of roſes, and has eighteen drops in the doric order diſpoſed in three ranks, ſix in each, placed to the right-hand of the guttæ, and at the bottom of the triglyphs.

SOFI, or SOPHI. See the article SOPHI.

SOFTENING, in painting, the mixing and diluting of colours with the bruſh or pencil. To ſoften deſigns in black and white made with the pen, &c. ſignifies to weaken the tint. To ſoften a portrait, according to Felibien, is to change ſome of the ſtrokes, and give a greater degree of ſweetneſs and ſoftneſs to the air thereof, which before had ſomething rough and harſh in it.

SOGDIANA, a country of Aſia, ſituated on the north ſide of the river Oxus, which ſeparated it from antient Bactria, now a part of Uſbec Tartary.

SOGETTO, SUBJECT, in muſic, is uſed for a ſong or melody, above or below which ſome counterpoint is to be made: a counterpoint above the ſubject, is when the lower part is the ſubject; in this ſenſe it is called canto fermo. When the counterpoint is made below the ſubject, the upper part is the ſubject. If this ſubject does not change the figure or ſituation of notes, be it above or below the counterpoint, it is called the invariable ſubject, and if it changes, the variable ſubject. Sogetto is alſo uſed for the words to which ſome compoſition is to be adapted. And, laſtly, this word is made uſe of for a ſucceſſion of many notes of one, two, or more meaſures, diſpoſed in ſuch a manner as to form one or more fugues. See the article COUNTERPOINT, &c.

SOHAM, a market-town of Cambridgeſhire, ſituated on a lake called Soham Meer, in the iſle of Ely, fourteen miles north-eaſt of Cambridge.

SOIGNIES, a town of the auſtrian Netherlands, ſituated in the province of Hainault, ten miles north-eaſt of Mons.

SOIL, *ſolum*, in agriculture and gardening, denotes earth or ground conſidered with regard to the quality of its mould for

for the production and growth of vegetables. See the article EARTH.

The land of England, as considered by the farmer, is reduced into nine sorts of soil: the sandy, the gravelly, the chalky, the stony, the rocky, the hazely, the black earth, the marsh, and the clay-land. See the articles SAND, GRAVEL, &c.

Mortimer observes, that these soils, in many places, are mixed and blended together, and that where it is so, it is much better than where they are separate or single; especially where the mixtures happen to be of a right kind, as those of the hot and the dry soils blended with the cold and the moist. Nature does this often, and art may imitate it. All sands are hot, and all clays are cold, and therefore the laying clay upon sandy lands, and sand upon clayey lands, is the best of all manure: this alters and changes for the better the very nature of the land itself, whereas dung only improves it for a time, and after that leaves it as bad as it was before. Mixt soils, that tend to the clayey-kind, are the best of all others for corn. It is not only the natural soil we are to consider, but the depth of it, and what soil is underneath; for the richest soil, if it be only eight or ten inches deep, and lies upon a cold clay, or upon stone, will not be so fruitful to the farmer as the leaner soil that lies upon better under-strata. Gravel or sand are the best under-strata of all others, to make the land above prolific.

Cold and wet clays are much more fruitful in the southern parts of England, than in the north. The climates, therefore, are to be considered, and the quantities or proportions of the different kinds in the mixed soils.

The greatest article, in the culture of plants, trees, &c. is the soil; and in many cases it is not sufficient, when having found a soil, which once tried proves convenient, to suppose that it will always continue so. In track of time the soil, which was once proper for the nourishment of some peculiar vegetable, loses its virtue; and this sooner in some lands, and later in others. All who are conversant in husbandry, are well acquainted with this. If a good piece of ground be chosen for the sowing of wheat, and it produces very well the first year, it will not for ever continue to do so; the second year's crop will be perhaps good, and the third and fourth tolerable: all this while the land is in heart, as the farmers express it, but after this it becomes improper, and very little wheat will be raised if sown upon it; yet when it refuses to produce wheat, it will, without any alteration, produce barley in sufficient plenty for some years; when it will yield no more good crops of barley, it may be still sowed with oats, and will produce that grain as well as fresh land; and when it has been worn out with all these, it will produce pease. After this it is made quite barren, and can be of no farther use to the farmer, the vegetative quality of it being worn off by these successive crops, each sort of grain taking off that part which is more peculiarly fitted for its own nourishment; the wheat first, and the rest in their order.

Mr. Tull thinks, that the only difference of soil, except the richness, seems to be the different heat and moisture it has; for that if these be rightly adjusted, any soil will nourish any sort of plant; for let thyme and rushes change places, and both will die; but let them change their soil, by removing the earth wherein the thyme grew from the dry hill down to the watry bottom, and plant rushes therein, and carry the moist earth wherein the rushes grew up to the hill, and there thyme will grow in the earth that was taken from the rushes, and so will the rushes grow in the earth that was taken from the thyme; so that it is only more or less water that makes the same earth fit for the growth of thyme or rushes; for our earth, when it has in the stove the just degree of heat that each sort of plant requires, will maintain plants brought from both the Indies.

The same writer observes, that as we have no way to enrich the soil but by pulveration of manure, or of instruments, so nature has ordained that the soil shall be exhausted by nothing but by the roots of plants.

There is a kind of hazely earth, Mortimer observes, with a redish cast, frequent in Essex and some other countries, which approaches to the nature of loam, and is called by the farmers brickish-soil: the best produce of this earth is rye; if well dug it will bear white oats, turnips, barley, wheat, buck-wheat, and pease; the natural produce in weeds, is broom, fern, quitch-grass, and the like. If it be well dunged, it will produce large crops of clover, but it soon wears out of it, and therefore should be sowed mixed with

rye-

rye-grafs. The beft manure for thefe lands is chalk mixed with coal-afhes; marle makes a great improvement in them, and there is a ftiff yellow kind of clay that moulders with the froft, and anfwers the fame purpofe.

SOISSONS, a city of France, in the province of the ifle of France, fituated on the river Ayfe, fifty-five miles north-eaft of Paris.

SOIT FAIT COMME IL EST DESIRE', *be it done as it is defired,* a form ufed when the king gives the royal affent to a private bill preferred in parliament.

SOK, SOKE, or SOC, in our antient cuftoms. See the article SOC.

SOL, in mufic, the fifth note of the gammut, *ut, re, mi, fa, fol, la.* See GAMMUT.

SOL, or SOU, a french coin made up of copper mixed with a little filver. See the article COIN.

SOL, the SUN, in aftronomy, aftrology, *&c.* See the article SUN.

SOL, in chemiftry, is gold, thus called from an opinion that this metal is in a particular manner under the influence of the fun. See the article GOLD.

SOL, in heraldry, denotes Or, the golden colour in the arms of fovereign princes. See the article OR.

SOLÆUS, or SOLARIS, in anatomy, one of the extenfor mufcles of the foot, rifing from the upper and hinder part of the tibia and fibula. This is a large and fat mufcle, thicker at the middle than at the edges, and is nearly of an oval figure.

SOLANUM, NIGHT-SHADE, in botany, a genus of the pentandria-monogynia clafs of plants, the corolla whereof confifts of a fingle rotated petal; the fruit is a round fmooth berry, punctuated at the top, and formed into two cells; the receptacle is flefhy and convex on both fides, and the feeds are numerous and roundifh.

This genus comprehends the folanum, melongena and lycoperficon of authors; or the common night fhade, the woody night fhade, the love-apple, and the mad-apple, *&c.*

Common night-fhade is ufed to allay inflammations, to foften and relax the fibres which undergo too violent a tenfion; they apply the bruifed herb to the piles, or bathe the part with the juice a little warmed: this juice is faid to be proper in wounds where the blood is extravafated and grumous; it is alfo fudorific and diuretic, expelling gravel from the kidneys.

Some years ago, the internal ufe of the folanum was much recommended by fome writers, in cancerous cafes, foul ulcers, and fcorbutic eruptions: however later experience has found this fimple to be not only of little or no efficacy in fuch cafes, but to be attended with actual danger to the patient.

SOLAR, fomething belonging to the fun: thus the folar fyftem is that fyftem of the world wherein the heavenly bodies are made to revolve round the fun as the center of their motion. See COPERNICAN. Alfo the folar year is that confifting of three hundred and fixty-five days, five hours, and forty-nine minutes, in oppofition to the lunar year, confifting of three hundred and fifty-four days. See YEAR. For the folar month, folar cycle, folar eclipfe, *&c.* fee the articles MONTH, CYCLE, ECLIPSE, *&c.*

SOLDAN. See the article SULTAN.

SOLDANIA BAY, a bay of the Atlantic ocean, fituated on the fouth-weft coaft of Africa, in eaft long. 15°, fouth latitude 33° 30'.

SOLDANELLA, in botany, a genus of the pentandria-monogynia clafs of plants, the corolla whereof confifts of a fingle petal of a campanulated form, and jagged at the edge; the fruit is an oblong cylindric capfule, obliquely ftriated, containing only one cell, and opening in ten places at the point; the feeds are numerous, acuminated, and fmall; the receptacle columnar and free.

SOLDER, SODDER, or SODER, a metalic or mineral compofition ufed in foldering or joining together other metals. See the next article.

Solders are made of gold, filver, copper, tin, bifmuth, and lead; ufually obferving, that in the compofition there be fome of the metal that is to be foldered mixed with fome higher and finer metals. Goldfmiths ufually make four kinds of folder, *viz.* folder of eight, where to feven parts of filver there is one of brafs or copper; folder of fix, where only a fixth part is copper; folder of four, and folder of three. It is the mixture of copper in the folder that makes raifed plate come always cheaper than flat. The folder ufed by plumbers is made of two pounds of lead to one of block-tin. Its goodnefs is tried by melting it and pouring the bignefs of a crown-piece upon a table; for if good, there will arife little bright fhining ftars therein. The folder for copper is made like that of the plumbers, only with copper and tin; for very nice works,

works, inftead of tin they fometimes ufe a quantity of filver. Solder for tin is made of two thirds of tin and one of lead; but where the work is any thing delicate, as in organ pipes, where the juncture is fcarce difcernable, it is made of one part of bifmuth and three parts of pewter.

SOLDERING, among mechanics, the joining and faftening together two pieces of the fame metal, or of two different metals, by the fufion and application of fome metalic compofition on the extremities of the metals to be joined. See the laft article.

To folder upon filver, brafs or iron: take filver, five penny-weight; brafs, four penny-weight; melt them together for foft folder, which runs fooneft. Take filver, five penny-weight; copper, three penny-weight; melt them together for hard folder. Beat the folder thin, and lay it on the place to be foldered, which muft be firft fitted and bound together with wire, as occafion requires; then take borax in powder, and temper it like pap, and lay it upon the folder, letting it dry; then cover it with quick coals, and blow, and it will run immediately; take it prefently out of the fire, and it is done. It is to be obferved, that if any thing is to be foldered in two places, which cannot well be done at one time, you muft firft folder with the harder folder, and then with the foft; for if it be firft done with the foft, it will unfolder again before the other is foldered. Let it be obferved, that if you would not have your folder run about the piece that is to be foldered, you muft rub fuch places over with chalk.

In the foldering either of gold, filver, copper, and all the metals before-mentioned, there is generally ufed borax in powder, and fometimes rofin. As to iron, it is fufficient that it be heated red hot, and the two extremities thus hammered together, by which means they will become incorporated into one another.

SOLDIER, a military man lifted to ferve a prince or ftate, in confideration of a certain daily pay.

The foldiers are properly the land forces of a kingdom or ftate; but in England it is againft the antient law to keep an army of foldiers in time of peace. Where any foldier that is lawfully retained fhall depart from his colours without licence, he is declared to be guilty of felony by 18 Hen. VI. c. 9. and every foldier who either caufes a mutiny or deferts the fervice, fhall be punifhed with death or otherwife, as a court-martial fhall think fit. Alfo perfons fufpected of defertion, are to be apprehended by conftables, who fhall be allowed a reward of 20 s. for every fuch deferter. See the article DESERTER.

By the 4 Geo. I. c. 4. it is ordained, that no foldier fhall be taken out of the fervice by any procefs at law, unlefs it be for fome criminal matter, or where the debt he owes amounts to 10 l. at the leaft, of which affidavit is to be made, *&c.* Soldiers muft be quartered in inns and alehoufes only, and not in private houfes, without the confent of the owners, under certain penalties: and where victuallers refufe foldiers quartered on them, or conftables receive any reward for excufing their neglect, they forfeit a fum not above 5 l. nor under 30 s. by 3 Geo. II. c. 2. A perfon inlifted for a foldier, within four days after, is to be carried before the next juftice or chief magiftrate of a town, and is to declare his affent that he lifted voluntarily, *&c.* but if he then diffents thereto, on his returning the money received, and paying 20 s. he may be difcharged. In cafe any fubject of Great Britain or Ireland fhall lift or enter himfelf, or procure any one to be enlifted a foldier to go beyond the feas, without leave obtained from his majefty, fuch perfon fhall be punifhed as a felon by 8 and 9 Geo. II. There are acts annually made for punifhing mutiny, *&c.* of foldiers and falfe mufters, and for the better payment of the army and their quarters, *&c.* See COURT-MARTIAL.

SOLDURII, in antiquity, a kind of military clients or retainers to the great men in Gaul, particularly in Aquitania, mentioned by Cæfar. The foldurii were people who fhared all the good and ill fortune of their patrons, to whom if any difafter happened, they either underwent the fame, or killed themfelves; and Cæfar affures us, that no one had been ever known to refufe the alternative. Vigenere takes them to have been more than common foldiers, and to be even gentlemen in penfion, or appointment.

SOLE, in the manege, a nail or fort of horn under a horfe's foot, which is much more tender than the other horn that incompaffes the foot, and by reafon of its hardnefs is properly called the horn or hoof. A horfe's fhoe ought to be fo fet upon the hoof as not to bear upon the

fole,

ſo'e, for otherwiſe the ſole would be hurt, and not only make the horſe lame, but corrupt the fleſh that ſeparates it from the coffin-bone. To take out the ſole, is to do it without touching the horn of the hoof; or if you take off the horn, you make a hoof-caſt.

SOLEA, the SOAL FISH. See SOAL.

SOLEÆ, among the Romans, a kind of ſandals or ſlippers, which covered only the ſole of the feet, and were bound on with thongs of leather, inſtead of which the women and the effeminate ones of the other ſex tied them on with purple-coloured ribbons, or ſuch as were variouſly adorned with gold and ſilver.

SOLECISM, *ſolecíſmus*, in grammar, a falſe manner of ſpeaking contrary to the uſe of language and the rules of grammar, either in reſpect of declenſion, conjugation, or ſyntax.

SOLEMN, *ſolennis*, ſomething performed with much pomp, ceremony, and expence: thus we ſay, ſolemn feaſts, ſolemn funerals, ſolemn games, *&c.* See the articles FEAST, FUNERAL, *&c.*

In law, ſolemn ſignifies ſomething authentic, or that is cloathed in all its formalities.

SOLEN, or RAZOR-SHELL, in ichthyology, a genus of ſhells of a bivalve, oblong and ſomewhat rounded figure, with both the extremities open; the animal inhabiting it is a tethys. See the article TETHYS.

There are ſeveral ſpecies of the ſolen, ſome whereof are ſtraight, others crooked, ſome red, others variegated with brown and blue, ſome brown and white, others of a violet-purple-colour: this laſt is a beautiful ſmooth ſhell, from three to ſix inches long, and from one third to three quarters of an inch in diameter. There is alſo another not inelegant ſpecies, variegated with brown and blue, and a little arcuated. See plate CCLV. fig. 3.

SOLET and DEBET, words uſed in writs, *&c.* to recover rights, *&c.* See DEBET.

SOLE-TENANT, one that holds lands, *&c.* in his own right only, without any other perſon joined. A perſon muſt be ſeiſed of a ſole eſtate to deviſe the ſame by will, or for the wife to have a dower therein, *&c.* And where a man and his wife hold land for their lives, the remainder to their ſon, in that caſe if the man dies the lord ſhall not have heriot, becauſe he does not die ſole-tenant.

SOLFAING, in muſic, the naming or pronouncing the ſeveral notes of a ſong by the ſyllables *ut*, *re*, *mi*, *fa ſol*, *&c.* and in learning to ſing it.

Of the ſeven notes in the french ſcale *ut*, *re*, *mi*, *fa*, *ſol*, *la*, *ſi*, only four are uſed among us in ſinging, as *mi*, *fa*, *ſol*, *la*: their office is principally in ſinging, that by applying them to every note of the ſcale, it may not only be pronounced with more eaſe, but chiefly that by them the tones and ſemitones of the natural ſcale may be better marked out and diſtinguiſhed. This deſign is obtained by the four ſyllables *fa*, *ſol*, *la*, *mi*. Thus from *fa* to *ſol* is a tone, alſo from *ſol* to *la*, and from *la* to *mi*, without diſtinguiſhing the greater or leſs tone; but from *la* to *fa*, alſo from *mi* to *fa*, is only a ſemitone. If then theſe be applied in this order, *fa*, *ſol*, *la*, *fa*, *ſol*, *la*, *mi*, *fa*, &c. they expreſs the natural ſeries from C; and if that be repeated to a ſecond or third octave, we ſee by them how to expreſs all the different orders of tones and ſemi-tones in the diatonic ſcale; and ſtill above *mi* will ſtand *fa*, *ſol*, *la*, and below it the ſame inverted *la*, *ſol*, *fa*, and one *mi* is always diſtant from another an octave, which cannot be ſaid of any of the reſt, becauſe after *mi* aſcending come always *fa*, *ſol*, *la*, *fa*, which are repeated invertedly deſcending.

To conceive the uſe of this, it is to be remembered, that the firſt thing in learning to ſing, is to make one raiſe a ſcale of notes by tones and ſemi-tones to an octave, and deſcend again by the ſame; and then to raiſe and fall by greater intervals at a leap, as thirds and fourths, *&c.* and to do all this by beginning at notes of different pitch. Then thoſe notes are repreſented by lines and ſpaces, to which theſe ſyllables are applied, and the learners taught to name each line and ſpace thereby, which makes what we call ſolfaing, the uſe whereof is, that while they are learning to tune the degrees and intervals of ſound, expreſſed by notes on a line or ſpace, or learning a ſong to which no words are applied, they may not only do it the better by means of articulate ſounds, but chiefly, that by knowing the degrees and intervals expreſſed by thoſe ſyllables, they may more readily know the places of the ſemi-tones, and the true diſtance of the notes. See SINGING.

SOLICITOR, or SOLLICITOR, *ſolicitator*, a perſon employed to take care of, and manage ſuits depending in the courts of law or equity; and thoſe of the lower ſort, it is obſerved, are too often made uſe

use of, to the damage of the people, and the increase of champerty and maintenance. Solicitors are within the statute to be sworn and admitted by the judges, before they are allowed to practise in our courts, in like manner as attornies.

There is also a great officer of the law, next to the attorney-general, who is stiled the king's solicitor-general; who holds his office by patent, during the king's pleasure; has the care and concern of managing the king's affairs, and has fees for pleading, besides other fees arising by patents, *&c.* He hath his attendance on the privy council; and the attorney-general and he were antiently reckoned among the officers of the exchequer; they have their audience, and come within the bar in all other courts.

SOLID, in philosophy, a body whose parts are so firmly connected together, as not to give way, or slip from each other upon the smallest impression: in which sense solid stands opposed to fluid. See the article FLUID and BODY.

Geometricians define a solid to be the third species of magnitude, or that which has three dimensions, *viz.* length, breadth, and thickness or depth.

A solid may be conceived to be formed by the revolution, or direct motion, of a superficies of any figure whatever, and is always terminated or contained under one or more planes or surfaces, as a surface is under one or more lines.

Solids are commonly divided into regular and irregular. The regular solids are those terminated by regular and equal planes, and are only five in number, *viz.* the tetrahedron, which consists of four equal triangles; the cube, or hexahedron, of six equal squares; the octahedron, of eight equal triangles; the dodecahedron, of twelve; and the icosihedron, of twenty equal triangles. See the articles TETRAHEDRON, CUBE, *&c.*

The irregular solids are almost infinite, comprehending all such as do not come under the definition of regular solids; as the sphere, cylinder, cone, parallelogram, prism, parallelopiped, *&c.* See the articles SPHERE, CYLINDER, *&c.*

SOLID *of least resistance.* Sir Isaac Newton, in his Principia, shews, that if there be a curve figure, as DNFG (plate CCLVI. fig. 1.) of such a nature, as that from any point, as N, taken in its circumference, a perpendicular NM be let fall on the axis AB; and if from a given point, as G, there be drawn the right line GR, parallel to a tangent to the curve in the point N, cutting the axis produced in R; and the proportion then be, as NM : GR : : $GR^3$ : 4BG × GR; the solid generated by the revolution of this curve about its axis AB, when moved swiftly in a rare and elastic medium, will meet with less resistance from the medium, than any other circular solid whatever, of the same length and breadth.

SOLID ANGLE, is that formed by three or more planes meeting in a point, like the point of a diamond well cut.

SOLID BASTION. See BASTION.

SOLID NUMBERS, are those which arise from the multiplication of a plane number, by any other whatsoever; as 18 is a solid number made of 6 (which is plane) multiplied by 3; or of 9 multiplied by 2.

SOLID PROBLEM, in mathematics, is one which cannot be geometrically solved unless by the intersection of a circle and a conic section; or, by the intersection of two other conic sections, besides the circle.

As to describe an isosceles triangle on a given right line, whose angle at the base shall be triple to that at the vertex.

This will help to inscribe a regular heptagon in a given circle; and may be resolved by the intersection of a parabola, and a circle.

This problem also helps to inscribe a nonagon in a circle; and may be solved by the intersection of a parabola, and an hyperbola between its asymptotes, *viz.*

To describe an isosceles triangle, whose angle at the base shall be quadruple of that at the vertex.

And such a problem as this hath four solutions, and no more; because two conic sections can cut one another but in four points.

*Line of* SOLIDS, on the sector. See the article SECTOR.

SOLIDS, in anatomy, *&c.* denote the continent parts of the human body; being a congeries of pipes, or vessels, which contain a liquor.

The solid parts of the body, though equally composed of vessels, are different with regard to their consistence; some being hard, and others soft. The hard, as the bones and cartilages, give firmness and attitude to the body, and sustain the other parts: the soft parts, either alone, or together with the hard, serve to execute the animal functions.

The

The solids are commonly divided into similar or simple; and dissimilar, compounded, or organic. The similar parts are the fibres, membranes, bones, cartilages, ligaments, muscles, tendons, aponeuroses, glands, arteries, veins, nerves, the secretory and excretory canals, and the common integuments. See the articles FIBRE, MEMBRANE, &c.

The dissimilar are such as are composed of the former, as the viscera and other parts of the body, *viz.* the head, neck, thorax, abdomen, and extremities: every one of which is again subdivided into lesser portions. See the articles HEAD, THORAX, INTESTINES, &c.

SOLIDAGO, GOLDEN ROD, in botany, a genus of the syngenesia-polygamia-superflua class of plants, the receptacle of which is naked, the down simple, and the radii of each corollula about five in number: add to this, that the squamæ of the cup are imbricated and closed.

The flowers of the golden-rod are of the radiated kind, the disc of which is covered with floscules and semi-floscules, as represented in plate CCLVI. fig. 2.

Golden rod grows wild in heaths and woods, producing spikes of yellow flowers in August: its leaves, which have a moderately astringent and bitter taste, are esteemed good in disorders arising from debility and laxity of the viscera.

SOLIDITY, *soliditas*, that property of matter, or body, by which it excludes all other bodies from the place which itself possesses: and as it would be absurd to suppose, that two bodies could possess one and the same place at the same time, it follows, that the softest bodies are equally solid with the hardest. See the articles MATTER and IMPENETRABILITY.

Among geometricians, the solidity of a body denotes the quantity or space contained in it, and is called also its solid content, which may be seen under the several articles CUBE, CYLINDER, SPHERE, PYRAMID, CONE, &c.

SOLIDITY, in architecture, is applied both to the consistence of the ground, whereon the foundation of a building is laid; and to a massive in masonry, of extraordinary thickness, without any cavity within.

SOLILOQUY, *soliloquium*, a reasoning or discourse which a man holds with himself; or, more properly, according to Papias, it is a discourse by way of answer to a question, that a man proposes to himself.

Soliloquies are become very common things on the modern stage; yet can nothing be more inartificial, or more unnatural, than an actor's making long speeches to himself, to convey his intentions to the audience. Where such discoveries are necessary to be made, the poet should rather take care to give the dramatic persons such confidants as may necessarily share their inmost thoughts, by which means they will be more naturally conveyed to the audience: yet is even this a shift, an accurate poet would not be found to have occasion for. The use and abuse of soliloquies is well delivered by the duke of Buckingham, in the following lines:

Soliloquies had need be very few,
Extremely short, and spoke in passion too.
Our lovers talking to themselves, for want
Of others, make the pit their confidant:
Nor is the matter mended yet, if thus
They trust a friend, only to tell it us.

SOLINGEN, a town of Germany, in the circle of Westphalia and dutchy of Berg, fifteen miles south east of Dusseldorp.

SOLIS VIA. See the article VIA.

SOLITARY, *solitarius*, something retired, or in private, remote from the company or commerce of others of the same species.

SOLITARIES, a denomination of nuns of St. Peter of Alcantara, instituted in 1776, the design of which is to imitate the severe penitent life of that saint: thus they are to keep a continual silence, never to open their mouths to any body but themselves; employ their time wholly in spiritual exercises, and leave the temporal concerns to a number of maids, who have a particular superior in a separate part of the monastery: they always go bare-footed, without sandals; gird themselves with a thick cord, and wear no linen.

SOLITAURILIA. See the article SUOVETAURILIA.

SOLMS, the capital of the county of Solms, in the landgraviate of Hesse-Cassel, in Germany, thirty-five miles north of Frankfort.

SOLO, in music, a term used in pieces consisting of several parts, to mark those that are to perform alone: it is sometimes denoted by S.

When two or three parts play, or sing, separately from the grand chorus, they are

are called a dio foli, a tre foli, *&c.*

SOLOMON's ISLAND, a clufter of iflands in the Pacific ocean, fituated between 130° and 140° weft longit. and between 7° and 12° fouth latitude.

SOLOMON's SEAL, in botany. See the article POLYGONATUM.

SOLOTHURN, or SOLEURE, one of the cantons of Switzerland, lying between thofe of Bafil and Bern, the former on the north, and the latter on the fouth.

The city of Solothurn, capital of the faid canton, is fituated in eaft long. 7° 15′, and north lat. 47° 18′.

SOLSTICE, in aftronomy, that time when the fun is in one of the folftitial points; that is, when he is at his greateft diftance from the equator, thus called, becaufe he then appears to ftand ftill, and not to change his diftance from the equator for fome time; an appearance owing to the obliquity of our fphere, and which thofe living under the equator are ftrangers to.

The folftices are two in each year, the æftival or fummer-folftice: and the hyemal or winter-folftice: the fummer-folftice is when the fun feems to defcribe the tropic of cancer, which is on June 22, when he makes the longeft day: the winter-folftice is when the fun enters the firft degree, or feems to defcribe the tropic of capricorn, which is on December 22, when he makes the fhorteft day. See the article TROPICS.

This is to be underftood as in our northern hemifphere; for in the fouthern, the fun's entrance into capricorn makes the fummer-folftice, and that into cancer the winter-folftice. See GLOBE.

The two points of the ecliptic, wherein the fun's greateft afcent above the equator, and his defcent below it, are terminated, are called the folftitial points; and a circle, fuppofed to pafs thro' the poles of the world, and thefe points, is called the folftitial colure. See the article COLURES.

The fummer-folftitial point is in the beginning of the firft degree of cancer, and is called the æftival or fummer-point; and the winter-folftitial point is in the beginning of the firft degree of capricorn, and is called the winter-point. Thefe two points are diametrically oppofite to each other.

SOLVENT, the fame with diffolvent. See the article DISSOLVENT.

SOLUTION, in chemiftry, denotes an intimate mixture of folid bodies with fluids, fo as feemingly to form one homogene liquor: the diffolving fluid is termed the diffolvent or menftruum. See the articles DISSOLVENT and MENSTRUUM.

The principles of folution have been already explained under the article MENSTRUUM.

As to the manner of affecting folutions, it varies according to the different folvents ufed for that purpofe, and is reduced to the following heads by Boerhaave: 1. Solution is performed by water, by diluting, infufing, boiling, diftilling, mixing, fermenting, putrefying, and feparating. 2. With oil, by diluting, infufing, boiling, diftilling, mixing, feparating; but not by fermenting, or by putrefying. 3. With fire, by calcining, roafting, burning, melting, fubliming, mixing, feparating, and promoting feveral other operations. 4. With the affiftance of air, by fermenting, putrefying, agitating, exciting, and adding other parts capable of diffolving. 5. With fermented fpirits, by diluting, infufing, boiling, diftilling, mixing, and making oils thinner. 6. With alkaline falts, by calcining, torrefying, burning, melting, mixing, and feparating, according to the various force of a dry fire employed. 7. By volatile alkaline falts, by fubliming in the dry way; and by diluting, diftilling, and digefting in the moift way. 8. With fixed alkaline falts, affifted and moved by water and fire, by digefting, boiling, diluting, feparating, and mixing. 9. With fixed acid falts, as thofe of alum, fulphur, and vitriol; either feparately in a liquid form, or in their calxes, by diluting, boiling, diftilling, digefting: or in a dry form, by calcining, roafting, burning, and diftilling. 10. With volatile acid falts, by diluting, digefting, diftilling and infinuating. 11. With compound falts and foaps, by calcining, fubliming, diftilling, and digefting, either in a dry or a liquid form. 12. With metals, by fufion and amalgamation. See the articles DILUTING, DISTILLING, *&c.*

In pharmacy, however, the principal menftrua are water, vinous fpirits, oils, and acid and alkaline liquors.

Water is the diffolvent of all falts, vegetable gums, and of animal jellies: of the firft it diffolves only a determinate quantity, though of one kind of falt more than another; and being thus faturated, leaves any additional quantity of the fame falt untouched: but it is never faturated with the two latter, uniting readily

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dily with any proportions of them, and forming, with different quantities, liquors of different confiftencies. When affifted by trituration, it likewife diffolves the vegetable gummy refins, as ammoniacum and myrrh; the folutions of which though imperfect, or not tranfparent; but turbid and of a milky hue, are neverthelefs applicable to valuable purpofes in medicine.

Rectified fpirit of wine diffolves the effential oils and refins of vegetables, the pure diftilled oils of animals, and foaps; though it does not act upon the expreffed oil and fixed alkaline falt of which foap is made: it alfo, by the affiftance of heat, diffolves volatile alkaline falts, but more efpecially the neutral ones, as the fal diureticus, *&c.*

Oils diffolve vegetable refins and balfams, wax, animal fats, mineral bitumens, fulphur, and certain metallic fubftances, particularly lead: however, the expreffed oils are more powerful menftrua for moft of thefe bodies, than the oils obtained by diftillation; becaufe the former are more capable of fuftaining, without injury, a ftrong degree of heat, which, in moft cafes, is neceffary to enable them to act. Acids diffolve alkaline falts and earths, and metallic fubftances: however, the different acids differ greatly in their action upon thefe laft. The vegetable acids diffolve a confiderable quantity of zinc, iron, copper, and tin; and extract fo much from the metallic part of antimony as to become powerfully emetic: they likewife diffolve lead, if previoufly calcined; but more copioufly, if corroded by their fteam. The marine acid diffolves zinc, iron, and copper; and though it fcarce acts upon any other metallic fubftance, in the common way, may neverthelefs be artfully combined with them all, except gold: fuch is the corrofive fublimate of the fhops. The nitrous acid is the common menftruum of all metallic fubftances, except gold and the antimonial femi-metal, which are foluble only in a mixture of the nitrous and marine acids, called aqua regia. The vitriolic acid eafily diffolves zinc, iron, and copper: and may be made to corrode, or imperfectly diffolve, moft of the other metals. See Acid.

Alkaline lixivia diffolves oils, refins, and fulphur; but their power is greatly promoted by the addition of quick-lime, as is evident in the making of foap and the common cauftics. Thus affifted, they reduce the flefh, bones, and other folid parts of animals, into a gelatinous matter. Solutions made in water and in fpirit of wine, poffefs the virtues of the bodies diffolved: whereas oils generally blunt its activity, and acids and alkalies alter natural qualities. Hence watery and fpirituous liquors are the only proper menftrua of the native virtues of vegetable and animal matters.

Moft of the foregoing folutions are eafily effected by pouring the menftruum on the body to be diffolved, and fuffering them to ftand together, for fome time, expofed to a fuitable warmth: a ftrong heat is generally neceffary to enable oils and alkaline liquors to perform their office. The action of acids is ufually accompanied with heat, effervefcence, and a copious difcharge of fumes. And as the fumes, which arife during the diffolution of fome metals in the vitriolic acid, prove inflammable, the operator ought to be careful, left, by the imprudent approach of a candle, the exhaling vapour be fet on fire.

Solution is much facilitated, by powdering fuch tenacious bodies as are friable; and flicing, or rafping, into fmall parts fuch whofe texture does not admit of being powdered: this, in fome cafes, is of fuch importance, that the operation proves extremely tedious, if it be neglected. In folutions of metals, earths, or falts, with acid fpirits, care fhould be taken not to mix them too haftily, otherwife the ebullition will caufe the mixed liquor to overflow the veffels; and, in fome cafes, the unmanageable heat, together with the noxious fumes, will give the operator great embarraffment.

But befides the folutions made by adding fluid menftruums to the bodies to be diffolved, there is another kind, called deliquiation, or folution per deliquium, in which the moifture of the air is the menftruum. It is performed by expofing the matter to be diffolved to the air, in cellars, or other damp places; for fixed alkaline and neutral falts, and fome metallic falts, being thus expofed, attract its humidity, and at length become liquid. Some fubftances, not diffoluble by the application of water in its groffer form, as the butter of antimony, are eafily liquified by this flow action of the aerial moifture. See Antimony.

SOLUTION, in algebra and geometry, is the anfwering a queftion, or the refolving any problem propofed. See the articles Algebra and Geometry.

SOLUTION *of continuity*, in furgery, is the feparation of the natural cohefion of the folid parts of the body, by a wound. See CONTINUITY and WOUND.

SOLUTIVE, an appellation given to laxative and loofening medicines. See the article LAXATIVE MEDICINES.

Solutive tartar is a preparation of tartar, made by boiling eight ounces of cream of tartar with four ounces of fixed falt of tartar. See the article TARTAR.

SOMERSETSHIRE, a county of England, fituated on the Briftol-channel, and bounded by Wiltfhire, on the eaft; by Dorfetfhire, on the fouth; and by Devonfhire, on the weft: it is famous for the cloth manufacture.

SOMERTON, a market-town of Somerfetfhire, twelve miles fouth of Wales.

SOMME, a river of France, which running from eaft to weft through Picardy, by Amiens and Abbeville, falls into the Britifh-channel near St. Vallery.

SOMMIERS, a town of Languedoc, in France, fourteen miles north-eaft of Montpelier.

SOMNAMBULI, in medicine, perfons who walk in their fleep, otherwife called noctambuli. See NOCTAMBULI.

SOMNIFEROUS, or SOPORIFEROUS. See the article SOPORIFIC.

SOMNOLENTUM COMA, in medicine. See the article COMA.

SON, *filius*, an appellation given to a male child, confidered in the relation he bears to his parents.

A baftard is termed an illegitimate, or natural fon. See BASTARD.

SONATA, in mufic, a piece, or compofition, intended to be performed by inftruments only; in which fenfe it ftands oppofed to cantata, or a piece defigned for the voice. See CANTATA.

There are fonatas from one to eight parts, but ufually they are performed by a fingle violin, or with two violins and a thorough bafs for the harpfichord, and frequently a more figured bafs for the bafs-viol.

Sonatas, though extremely numerous, are reduced by the Italians to two kinds: 1. Thofe proper for church-mufic, which ufually begin with a grave and folemn motion, and afterwards ftrike into a brifker and gayer manner: thefe are what they more peculiarly call fonatas. 2. Thofe for the chamber, being little pieces for dancing.

SONCHUS, the SOW-THISTLE, in botany, a genus of the fyngenefia-polygamia-æqualis clafs of plants, the compound flower of which is imbricated and uniform; and the leffer corollulæ of which it is compofed, monopetalous, linear, and quinquedentated: the ftamina are five very fhort capillary filaments: there is no pericarpium but the cup, which clofes for that purpofe, and within it are the feeds, fomewhat oblong, winged with down, and affixed to the thalamus, or receptacle. See plate CCLVI. fig. 3.

Sonchus is accounted cooling and attenuant, and accordingly prefcribed in the ftranguries, as alfo in inflammations of all kinds, to be applied externally in the form of a cataplafm.

SONCINO, a town of the dutchy of Milan, in Italy, thirty-three miles eaft of the city of Milan.

SONDRIO, a town of the Grifons, being the capital of the Valteline: eaft long. 9° 50′, north lat. 46° 15′.

SONG, in poetry, a little compofition, confifting of eafy and natural verfes, fet to a tune in order to be fung.

The fong much refembles the madrigal, and ftill more the ode, which is nothing but a fong according to the antient rules. See the articles MADRIGAL and ODE.

The fubject of a fong is ufually love or wine; whence M. le Brun defines a modern fong to be either a foft and amorous, or a lively and bacchic thought, expreffed in a few words. But, be the fubject of the fong what it will, the verfes are to be eafy, flowing, and natural, and muft contain a certain harmony which neither fhocks the reafon or the ear, and which unites poetry and mufic agreeably together.

SONG, in mufic, is applied in general to a fingle piece of mufic, whether contrived for the voice or an inftrument. See the article COMPOSITION.

A fong, fays Mr. Malcolm, may be compared to an oration: for as, in this latter, there is a fubject, *viz.* fome perfon or thing the difcourfe is referred to, and which is always to be kept in view through the whole; fo, in every regular and melodious fong, there is one note which regulates the reft; wherein the fong begins, and at laft ends; and which is, as it were, the principal matter, or mufical fubject, to be regarded in the whole courfe of the fong; and this principal or fundamental note is called the key of the fong. See the article KEY.

SONNA, a book of mahometan traditions, wherein all the orthodox muffulmen are required to believe. See SONNITES.

SON-

SONNET, in poetry, a compofition contained in fourteen verfes, *viz.* two ftanzas, or meafures, of four verfes each, and two of three; the eight firft verfes being all in three rhimes.

The fonnet is of italian origin, and Petrarch is allowed to be its father. It is held the moft difficult and artful of all compofitions, as requiring the utmoft accuracy and exactnefs. It fhould end with fome pretty and ingenious thought, and its clofe fhould be particularly beautiful, otherwife the fonnet is naught.

SONNITES, among the mahometans, an appellation given to the orthodox muffulmen, or true believers; in oppofition to the feveral heretical fects, particularly the fchiites, or followers of Ali.

The fonnites are fo called from their believing in the fonna, or book of mahometan traditions; which the fchiites reject as apocryphal. The Turks affume the name of fonnites in oppofition to the Perfians, who are fchiites.

SOOP, or SOUP. See the article SOUP.

SOOT, *fuligo*, a volatile matter, arifing from wood, and other fuel, along with the fmoke; or rather, it is the fmoke itfelf, fixed and gathered on the fides of the chimney.

Wood-foot is of a fhining black colour, a difagreeable fmell, and an acrid, bitter and naufeous tafte; its chief ufe, for medicinal purpofes, being in hyfterical cafes, in which it is fometimes exhibited in conjunction with the fetid gums.

The volatile falt and fpirit of foot are, when fufficiently purified, not different in quality from thofe of animal fubftances; though fome prefer them in nervous complaints, and particularly in epileptic cafes. The tincture of foot is made thus: take of wood-foot, two ounces; of afa fœtida, one ounce; and proof-fpirit, two pints: digeft and ftrain. It is good not only in hyfterical cafes, but alfo in epilepfies, and other nervous diforders.

Soot makes an excellent manure for cold lands that have been over-run with mofs; but the foot of fea-coals is better for this purpofe than that of wood. The dyers alfo make confiderable ufe of foot, for a dun-colour.

SOPE, or SOAP. See the article SOAP.

SOPHI, or SOFI, a title given to the emperor of Perfia; importing as much as wife, fage, or philofopher. There is no prince in the world whofe authority is more abfolute than that of the fophi of Perfia.

SOPHIA is alfo a city of Turky, in Europe, in the province of Bulgaria: eaft long. 24°, north lat. 42° 30′.

SOPHISM, σοφισμα, in logic, *&c.* an argument which carries much of the appearance of truth, and yet leads into error. There is fome need of a particular defcription of thefe fallacious arguments, that we may with more eafe and readinefs detect and folve them.

1. The firft fort of fophifm is called ignoratio elenchi; or a miftake of the queftion. 2. The next fophifm is called petitio principii, or a fuppofition of what is not granted. 3. That fort of fallacy which is called a circle, is very near a-kin to the petitio principii. 4. The next fort of fophifm is called non caufa pro caufa, or the affignation of a falfe caufe. 5. The next is called fallacia accidentis, or a fophifm, wherein we pronounce concerning the nature and effential properties of any fubject, according to fomething which is merely accidental to it. 6. The next fophifm borders upon the former; and that is when we argue from that which is true, abfolutely, fimply, and abftracted from all circumftances: this is called, in the fchools, a fophifm *a dicto fecundum quid ad dictum fimpliciter*. This fort of fophifm has alfo its reverfe; as, when we argue from that which is true, fimply and abfolutely, to prove the fame thing true in all particular circumftances whatfoever. 7. The fophifms of compofition and divifion come next to be mentioned. The fophifm of compofition is, when we infer any thing concerning ideas in a compound fenfe, which is only true in a divided fenfe. The fophifm of divifion is, when we infer the fame thing concerning ideas in a divided fenfe, which is only true in a compounded one. This fort of fophifm is committed when the word *all* is taken in a collective and diftributive fenfe, without a due diftinction. It is the fame fallacy, when the univerfal word *all*, or *no*, refers to fpecies in one propofition, and to the individuals in another. 8. The laft fort of fophifms arifes from our abufe of the ambiguity of words, which is the largeft and moft extenfive kind of fallacy; and, indeed, feveral of the former fallacies might be reduced to this head. When the words or phrafes are plainly equivocal, they are called fophifms

phiſms of equivocation. This ſophiſm, as well as the foregoing, and all of the like nature, are ſolved by ſhewing the different ſenſes of the words, terms, or phraſes.

But, where ſuch groſs equivocations and ambiguities appear in arguments, there is little danger in impoſing on ourſelves or others; the greateſt danger, and what we are perpetually expoſed to, in reaſoning, is, where the two ſenſes or ſignifications of one term are near a-kin, and not plainly diſtinguiſhed; and yet are ſufficiently different in their ſenſe to lead us into great miſtakes, if we are not watchful. And, indeed, the greateſt part of controverſies, in the ſacred or civil life, ariſe from the different ſenſes that are put upon words, and the different ideas conveyed by them.

There is, after all theſe, another ſort of ſophiſm, which is wont to be called an imperfect enumeration or a falſe induction, when, from a few experiments or obſervations, men infer general theorems and univerſal propoſitions.

SOPHIST, a perſon who uſes ſophiſms, with a view to deceive thoſe he would perſuade or convince. See the preceding article.

SOPHISTICATION, the adulterating any thing with what is not good or genuine; a practice too common in the making up medicines for ſale; as alſo among vintners, diſtillers, and others, who are accuſed of ſophiſticating their wines, ſpirits, oils, &c. by mixing with them cheaper and coarſer materials: and, in many caſes, the cheat is carried on ſo artfully as to deceive the beſt judges. See the articles WINE, SPIRIT, OIL, &c. likewiſe HYDROMETER and HYDROSTATICAL BALANCE.

SOPHORA, in botany, a genus of plants belonging to the decandria monogynia claſs, with a papilionaceous flower: its fruit is a very long and ſlender unilocular pod, containing a great many roundiſh ſeeds. It agrees in every thing with the diadelphia and papilionaceous plants, except that its ſtamina is diſtinct and ſeparate.

SOPORIFIC, or SOPORIFEROUS, MEDICINES, are thoſe capable of procuring ſleep, as opiates, &c. See OPIATES, &c.

SOPOROUS, SLEEPY or DROWSY DISEASES, are the coma, lethargy, and carus; to which ſome add the apoplexy. See COMA, LETHARGY, &c.

SOPRON, a city of lower Hungary, thirty miles ſouth of Vienna.

SORA, a town of the kingdom of Naples, fifty miles north of the city of Naples.

SORAW, a town of Upper Saxony, near the confines of Sileſia: eaſt long. 15° 20′, north lat. 51° 38′.

SORBON, or SORBONNE, the houſe or college of the faculty of theology, in the univerſity of Paris; ſometimes alſo uſed for the faculty itſelf, becauſe it uſually aſſembles in the houſe of the ſorbon.

SORBUS, the SERVICE and QUICKEN-TREE, in botany, a genus of the icoſandria-monogynia claſs of plants, the flower of which conſiſts of five hollow and roundiſh petals; and its fruit is a ſoft, globoſe, and umbilicated berry, containing three oblong and cartilaginous ſeeds.

SORCERY, the crime of witch-craft, or divination by the aſſiſtance of evil ſpirits. See the article WITCH-CRAFT.

SORET, a province of the hither India, lying northwards of Guzerat: its chief town is Jaganat.

SOREX, the SHREW-MOUSE, in zoology. See the article SHREW-MOUSE.

SORITES, in logic, a ſpecies of reaſoning, in which a great number of propoſitions are ſo linked together, that the predicate of the one becomes continually the ſubject of the next following, till at laſt a concluſion is formed by bringing together the ſubject of the firſt propoſition and the predicate of the laſt: ſuch is the following argument, 'God is omnipotent; an omnipotent being can do every thing poſſible; a being that can do every thing poſſible, can do whatever involves not a contradiction; therefore, God can do whatever involves not a contradiction.'

This combination of propoſitions may be continued to any length we pleaſe, without in the leaſt weakening the ground upon which the concluſion reſts; and the reaſon is, becauſe the ſorites may be reſolved into as many ſimple ſyllogiſms as there are middle terms in it; and the concluſion of the laſt ſyllogiſm is univerſally found to be the ſame with the concluſion of the ſorites. See SYLLOGISM.

SORRANCE, among farriers, a malady incident to horſes; of which there are two kinds: 1. An evil counted twofold, as either an evil ſtate or compoſition of a horſe's body; which is to be obſerved either by the ſhape, number, quantity, or ſight of the member ill affected or diſeaſed.

difeafed. 2. It is ufed for the loofening and divifion of an unity, which as it may change diverfely, fo it has divers names accordingly; for if fuch a loofening and divifion be in a bone, then it is called a fracture; if in any flefhy part, a wound or ulcer; if in the veins, a rupture; if in the finews, a convulfion or cramp; and if in the fkin, an excoriation.

Sorrance-water is a folution of roman-vitriol and fome other ingredients, in vinegar: it is much efteemed as a remedy in many of the difeafes of horfes, but efpecially the forrance: whence the name.

SORREL, or COMMON SORREL, *acetofa*, in botany, a fpecies of rumex. See the article RUMEX.

The feeds of this plant are efteemed aftringent and good in diarrhœas, dyfenteries, and hæmorrhages.

*Wood* SORREL, *oxalis*, *oxys*, or *oxyoides*, in botany, a genus of the decandria-pentagynia clafs of plants; the corolla of which is divided into five parts, which cohere only by their ungues, and are erect, obtufe, and emarginated: the fruit is a pentagonal capfule, containing five cells, with roundifh feeds.

The leaves of wood-forrel are of a very agreeable acid tafte, and are recommended in fevers of all kinds, and the fcurvy: there is a conferve of them kept in the fhops, as a refrigerant.

SORREL-COLOUR, in the manege, is a reddifh colour, generally thought to be a fign of a good horfe.

SORRENTO, a city and port-town of the kingdom of Naples, eighteen miles fouth of that city.

SORTILEGE, *fortilegium*, a fpecies of divination, performed by means of fortes or lots.

The fortes preneftinæ, famous in antiquity, confifted in putting a number of letters, or even whole words, into an urn; and then, after fhaking them together, they were thrown on the ground, and whatever fentences could be made out from them conftituted the anfwer of the oracle.

Another kind of fortes confifted in taking fome celebrated poet, as Homer or Virgil, and opening the book, whatever prefented itfelf firft to the eye made the anfwer; and hence it got the name of fortes homericæ, and fortes virgilianæ, &c.

The fuperftitious among the antient chriftians practifed a fimilar kind of divination, by opening the Old and New-Teftament; whence it got the name of fortes fanctorum.

SORY, or RUSMA, in natural-hiftory, a vitriolic mineral, formed of metalline, fulphureous, and earthen matter; being truly an ore of blue vitriol, or of the vitriol of copper alone, there not appearing to be a grain of any thing approaching to iron in it.

It is found in loofe maffes of different fizes, and moftly of a blackifh colour, though fometimes reddifh or bluifh. It is found in many parts of Turky and in Germany, where it is wrought for blue vitriol, which may be feparated from it by a very eafy procefs, by powdering the fory, then expofing it to a moift air for three or four days, and laftly boiling it in fix times its weight of water: for if this liquor be filtrated and evaporated in the ufual manner to a pellicle, and then fet in a cool place to fhoot, there will be found cryftals of pure blue vitriol adhering to the fides of the veffels. See the article VITRIOL.

SOSPELLO, a town of Piedmont, fifteen miles north-eaft of Nice.

SOSPIRO, in the italian mufic, denotes a paufe equal to the time of a crotchet.

SOTERIA, in antiquity, facrifices offered to the gods for delivering a perfon from danger; as alfo poetical pieces compofed for the fame purpofe.

SOTOVENTO-ISLANDS are fituated on the coaft of Terra-Firma; the chief of which are Trinidad, Margaretta, Tortuga, &c. They are alfo called the leffer Antilles.

SOU, or SOL, a french coin. See COIN.

SOVANA, a town of Tufcany, in Italy, fituated on the confines of the pope's territories, 25 miles weft of Orvietto.

SOUBISE, a town of Guienne, in France, fituated on the river Charente, feventeen miles fouth of Rochelle.

SOUGH, among miners, denotes a paffage dug under ground, to convey off water from mines. See the article MINE.

SOVERAIGN, *fupremus*, ftrictly fpeaking, fignifies the Supreme Being, or God. See the article GOD.

SOVERAIGN, in matters of government, is applied to the fupreme magiftrate, or magiftrates, of an independent government or ftate; by reafon their authority is only bounded by the laws of God, of nature, and the fundamental laws of the ftate: fuch are kings, princes, &c.

SOVERAIGN is alfo an appellation given to the fupreme courts of judicature. See the article COURT.

SOUILLAC, a town of Guienne, in France, thirty-two miles north of Cahors: eaft long. 1° 12′, north lat. 45°.

SOUL, *anima*, in philofophy, a fpiritual fubftance, which animates the bodies of living creatures: it is the principle of life and activity within them. See the articles ANIMAL, LIFE, SPIRIT, &c.

Various have been the opinions of philofophers concerning the fubftance of the human foul. The epicureans thought it a fubtle air, compofed of their atoms, or primitive corpufcles. The ftoics, on the contrary, maintained it was a flame, or portion of heavenly light. And the cartefians make thinking the effence of the foul. Others again, hold, that man is endowed with three kinds of foul, *viz.* the rational, which is purely fpiritual, and infufed by the immediate infpiration of God; the irrational or fenfative, which being common to man and brutes, is fuppofed to be formed of the elements; and laftly, the vegetative foul, or principle of growth and nutrition, as the firft is of underftanding, and the fecond of animal life.

Lord Bacon obferves, that there are many excellencies in the human foul above thofe of brutes; and that where fo many and fuch great excellencies are found, a fpecific difference fhould always be made. Hence he highly difapproves of the confufed and promifcuous manner of philofophers in treating of the functions of the human foul, as if it differed in degree rather than kind from the fouls of brutes. However, he allows, that the doctrine concerning the rational foul of man muft be deduced from revelation: for as its fubftance, in its creation, was not formed out of the mafs of heaven and earth, but immediately infpired by God; and as the laws of the heavenly bodies, together with thofe of our earth, make the fubject of philofophy, fo no knowledge of the fubftance of the rational foul can be had from philofophy. But he might have faid the fame of corporeal fubftances, fince, as Mr. Locke juftly obferves, we have no idea of one more than of the other. See ESSENCE.

It is only from the primary, or effential, qualities of body, *viz.* extenfion, folidity, &c. that we form an idea of it; and why may we not frame the complex idea of a foul, or fpirit, from the operations of thinking, underftanding, willing, &c. which are experiments in ourfelves? This idea of an immaterial fubftance is as clear as that we have of a material one: for tho' this notion of immaterial fubftances may be attended with difficulties, we have no more reafon to deny or doubt of its truth, than we have to deny or doubt of the exiftence of the body. See EXISTENCE.

That the foul is an immaterial fubftance appears from hence, that its primary operations of willing and thinking have not only no connection with the known properties of body, but feem plainly inconfiftent with fome of its moft effential qualities. For the mind not only difcovers no relation between thinking, and the motion and arrangement of parts; but it likewife perceives that confcioufnefs, a fimple act, can never proceed from a compounded fubftance, capable of being divided into many parts. To illuftrate this, let us only fuppofe a fyftem of matter endowed with thought; then either all the parts of which this fyftem confifts, muft think, which would make it not one but a multitude of diftinct confcious beings: or its power of thinking muft arife from the connection of the parts one with another, their motion and difpofition, &c. which, all taken together, contribute to the production of thought. But it is evident that the motion of parts, and the manner of combining them, can produce nothing but an artful ftructure and various modes of motion. Hence all machines, however artfully their parts are put together, and however complicated their ftructure, though we conceive innumerable different motions, varioufly combined, and running one into another with an endlefs variety, yet never produce any thing but figure and motion. If a clock, or watch, tells the hour and minute, of the day, it is only by the motion of the different hands, pointing fucceffively at the different figures marked on the hour-plate for that purpofe. We never imagine this to be the effect of thought or intelligence, nor conceive it poffible, by any refinement of ftructure, fo to improve the compofition as that it fhall become capable of knowledge and confcioufnefs: and the reafon is plain, that thought being fomething altogether different from motion and figure, without the leaft connection between them, it can never be fuppofed to refult from them. See MATTER, MOTION, and FIGURE.

This then being evident, that intelligence cannot arife from an union or combination

bination of unintelligent parts; if we suppose it to belong to any system of matter, we must necessarily attribute it to all the parts of which that system is composed; whereby, instead of one, we shall, as was before observed, have a multitude of distinct conscious beings. And because matter, how far soever we pursue the minuteness of its parts, is still capable of repeated divisions, even to infinity; it is plain, that this absurdity will follow us through all the suppositions that make thought inherent in a material substance. Wherefore, as consciousness is incompatible with the cohesion of solid separable parts, we are necessarily led to place it in some other substance, of distinct nature and properties; and this substance we call spirit, which is altogether distinct from body, nay, and commonly placed in opposition to it; for which reason the beings of this class are called immaterial; a word that implies nothing of their true nature, but merely denotes its contrariety to that of matter. See SPIRIT.

As to the immortality of the human soul, the arguments to prove it may be reduced to the following heads: 1. The nature of the soul itself, its desires, sense of moral good and evil, gradual increase in knowledge and perfection, &c. 2. The moral attributes of God.

Under the former of these heads it is urged, that the soul, being an immaterial intelligent substance, as has been already proved, does not depend on the body for its existence; and therefore may, nay, and must, exist after the dissolution of the body, unless annihilated by the same power which gave it a being at first; which is not to be supposed, as there are no instances of annihilation in nature. This argument, especially if the infinite capacity of the soul, its strong desire after immortality, its rational activity and advancement towards perfection, be likewise considered, will appear perfectly conclusive to men of a philosophical turn; because nature, or rather the God of nature, does nothing in vain.

But arguments drawn from the latter head, *viz.* the moral attributes of the Deity, are not only better adapted to convince men unacquainted with abstract reasoning, but equally certain and conclusive with the former: for as the justice of God can never suffer the wicked to escape unpunished, nor the good to remain always unrewarded; therefore, arguments drawn from the manifest and constant prosperity of the wicked, and the frequent unhappiness of good men in this life, must convince every thinking person, that there is a future state wherein all will be set right, and God's attributes of wisdom, justice, and goodness fully vindicated. We shall only add, that had the virtuous and conscientious part of mankind no hopes of a future state, they would be of all men most miserable: but as this is absolutely inconsistent with the moral character of the Deity, the certainty of such a state is clear to a demonstration.

SOUND, *sonus*, a simple perception, or idea, communicated to the soul, by means of the ear, which is the primary organ of hearing. See EAR.

Sound is caused by an undulatory, or wave-like, motion of the air, arising from the tremulous motion of the parts of any sonorous body when struck upon; for those undulations, or pulses, of the air, beating on the tympanum or drum of the ear, convey by the auditory nerves the sensation of sound to the mind. See the article HEARING.

For that sound has a necessary dependence on the air, is proved by the experiment of the bell in an exhausted receiver; and the parts of a sonorous body being put into motion by percussion, excite concentric vibrations in the air all around the said body; so that let a person be any how, or any where, situated within the verge of those motions, and he will equally hear the sound, at equal distances from the body whence it comes. See plate CCLVII. fig. 1. n° 1. where DD represents a drum, and D 1, 2, 3, 4, 5, &c. the circular pulses of the air, made by, and conveying the sound of, the beats to our ears. For the particles of air contiguous to the sonorous body, being compelled by the first impulse to move forwards, propel those next to them, and these, others again, and so on, to a considerable distance, according to the intensity of the percussive force. But when the particles of the sonorous body make the second part of the vibration, by returning back again, the particles of air also, by their repulsive power, repel each other towards their proper places, and thus again expand themselves. Now since motion, once generated in elastic bodies, continues some time before it can be destroyed by the resistance and counter-action of contiguous bodies,

bodies, it follows, that the particles of the ſonorous body, and conſequently thoſe of the adjacent air, have for ſome time a reciprocal vibratory motion, by going forwards and backwards through very ſmall ſpaces in indefinitely ſmall portions of time; which motion gradually decreaſes till it be totally deſtroyed. To illuſtrate this, let A C (*ibid.* n° 2.) be an elaſtic ſtring or chord, fixed at the points A and C; and let it be drawn out of its natural poſition A C, into another ABC, upon which, being let go, it will, by its elaſticity, not only fly back to its firſt poſition A C, but into another AEC, near as far on the other ſide A C, as ABC was on the firſt: after this it will return again almoſt to B, and then return almoſt to E; and theſe courſes and recourſes of the ſtring growing ſtill leſſer and leſſer, it will at laſt ſettle in its firſt and natural poſition A D C.

When the chord begins its motion at firſt from B, it ſtrikes the particle of air contiguous to it; and that will, by its approach towards the next particle, affect it, by means of its repulſive power, which keeps all the particles at equal diſtances from each other; and ſo on, through ſuch a number of particles as can receive the motion while the ſtring moves from B to D. Let, therefore, A, B, C, D, E, F, G, *&c.* (*ibid.* n° 4.) repreſent ſuch a ſeries of particles of air, at an equal diſtance, and the firſt particle A contiguous to the middle point B of ſuch a ſtring, and agitated by it in its motion. The ſtring beginning to move, all the particles A, B, C, will begin to move forwards alſo; and, ſince this motion is propagated in time, let E be the remoteſt particle moved, while the chord is moveing from B to D; during which time the chord, having an accelerated motion, will cauſe the particles to approach each other with an accelerated motion likewiſe; and becauſe thoſe accelerated approaches begin at A, and reach to E, in the time the chord is going from B to D, therefore the diſtance A B will be leſs in B C, and this leſs than C D, and that leſs than D E, and the diſtance E F will begin to be leſſened, when the ſtring is arrived at the ſite A D C, and the particles A, B, C, D, E, F, *&c.* will have the arrangement repreſented in the ſecond line. But now the chord, having acquired the ſituation A D C, will be no farther accelerated, but on the contrary retarded, as it will now go on from D to E; the effect of which, upon the particles of air before it will be as follows: they will all go on forwards till the chord comes to E, and the particle A to its ſituation in the third line; but ſince the force upon A begins to abate, as the ſtring begins to move from D, the elaſtic force now between A and B will, by acting both ways, continue to accelerate the motion of B, and retard that of A. Thus the diſtance B C will ſtill diminiſh, till B comes to lie equi-diſtant between A and C; and C will be accelerated till it be equi-diſtant between B and D, and ſo on. So that, as the acceleration is continued forwards, the diſtances will diminiſh towards F; and, by the time the chord is arrived at E, the particles E E will be at their neareſt diſtance. And, ſince the motion of A is continually retarded, it will loſe what before it had gained in the ſame time, and will therefore now be at the ſame diſtance from B, as at firſt nearly. So that the particle from A to G will have the ſituations as repreſented in the third line.

The chord now returning from E to D, gives liberty to the repulſive power between A and B to ſeparate them to a greater diſtance than in their natural ſtate, and which they at preſent have. By this means all the other intervals, B C, C D, D E, E F, will increaſe, and become ſucceſſively greater than the natural diſtance; but that exceſs will be leſſer in each, till you come to F G, which will be equal to the natural diſtance at preſent between A and B. The motion at the ſame time continuing in all the particles from H to N, they will all move forwards, and the preſent contracted interval between H and I will ſucceed between all the reſt, till it arrives at the particle N, when the interval MN will be the ſame as at preſent is H I. And thoſe particles beyond N to S will, by the preceding ones, be put into the ſame reſpective diſtances, but in an inverſe order, as thoſe have between G and N. And the whole ſeries, now the ſtring is at D, will have the intervals of the particles reſembling thoſe in the fourth line.

The chord not ſtopping at the ſituation A D C, but going on to A B C, with a retarded motion, the velocity of the contiguous particle A will alſo be retarded, and becomes leſs than that of B; upon which, the diſtance between them will be leſſened, and the more ſo, as the ſtring ap-

approaches to B. Hence all the intervals, now dilated beyond their natural ſtate, will, by degrees, contract; but gradually ſlower, till you come to F, where the preſent largeſt interval between A and B will be found between F and G, and that between A and B will have acquired its natural extent, when the chord is arrived at B. Then, likewiſe, the particles from G to N will acquire the ſame ſituation as thoſe now have between A and G; and from N to S, the ſame as now is ſeen between G and N; and from S forwards the ſame as is now before the particle N, the point S being now the middle point of condenſation; all which is clearly ſeen in the fifth line of the figure. Thus the condenſation which begins at A, by the firſt part of the vibration, was propagated to G by the ſecond, from thence to N by the third, and, laſtly, to S by the fourth part of the whole motion of the ſtring, in going and returning; and this extent of air, thus agitated by the chord in going and returning, is called by Sir Iſaac Newton a wave, or pulſe of air. In which wave the particles from A to N are in a dilated ſtate, and from N to X in a contracted or condenſed ſtate; which two parts of the wave anſwer to the concave and convex, or low and high part of a watery wave.

As the chord goes on to make another vibration, it will not only continue to agitate the air, at preſent in motion, but will ſpread the pulſation of the air as much farther, and by the ſame degrees as before; and the like will happen after a very complete vibration of the ſtring. Thus the air being a fluid body, and the impreſſion made on any one part affecting all the particles alike around it, it is plain thoſe pulſes will be propagated in every direction all around in concentric aerial ſhells, or ſpherical waves of air.

That the motion of the pulſes in an elaſtic medium is analogous to that of waves generated in the ſurface of ſtagnant water, is evident, when we conſider that the condenſation of the parts of the elaſtic medium is in lieu of the elevation of the water; the elaſtic force effects the ſame in the medium, as gravity does in the water, and the denſeſt part of the pulſes correſponds to the higheſt part of the waves. Thus, let A B C (*ibid.* n° 3.) repreſent the ſonorous body; by the tremulous motion of its parts, it will agitate the air contiguous to every point as A, where it will be condenſed to a certain ſmall diſtance, and make a pulſe or wave of air, in the manner as has been already ſhewn. The firſt wave or pulſe will, by its elaſtic power in expanding itſelf, produce a ſecond, that a third, and ſo on; till the impreſſed motion be diffuſed through too large a quantity of air, to be any longer ſenſible.

The quantity of motion, produced by each tremor of the ſonorous body, being communicated ſucceſſively to large portions of air, the part thereof, which each particle will acquire, will conſtantly decreaſe. This decrement of the motion will be as the increment of the number of particles, which is as the ſuperficies of the ſpherical ſhell; and ſince all ſuperficies are as the ſquares of their diameters, or ſemi-diameters, therefore the force in the particles of the wave or ſhell at D is to that in the particles of the ſhell at F, as $AF^2$ to $AD^2$, that is, the force of ſound decreaſes as the ſquares of the diſtances increaſe.

It is plain the diſtance to which ſounds may be heard, will be proportional to the magnitude, or intenſity, of the ſtroke made on the tremulous body emitting the ſound; for, the greater that ſtroke is, the greater will be the agitation of the parts of the ſonorous body, and, of courſe, the greater will be the force with which they will ſtrike the particles of air. Laſtly, the greater the force is upon the air, the more cloſely will it be condenſed and expanded; hence the greater will be the ſtroke at any given diſtance on the drum of the ear, and, conſequently, the greater will be the diſtance at which the agitation of the air will be ſenſible.

The experiments are numerous by which it has been found, that ſound is audible to the diſtance of fifty, ſixty, or eighty miles: but Dr. Hearn, phyſician to the king of Sweden, tells us, that at the bombardment at Holmia, A. D. 1658, the ſound was heard to the diſtance of thirty ſwediſh miles, which make 180 of ours. And in the fight between England and Holland, A. D. 1672, the noiſe of the guns was heard even in Wales, which cannot be leſs than 200 miles.

But ſince the atmoſphere conſiſts not of pure air, but has an admixture of vapours of a different elaſticity and tone; theſe vapours will not participate of the motion of pure air, by which ſound is propagated; in like manner as an elaſtic ſtring, if ſtruck, will not move another

very

very near it, unleſs it be under the ſame degree of tenſion, and of the ſame tone. Therefore the quantity of air producing ſound muſt be diminiſhed in proportion to the quantity of vapour, in a given ſpace; in which Sir Iſaac ſuppoſes the air is to the vapour as 10 to 1. Whence the air and vapour togethe in a given ſpace is to the pure air as 11 to 10.

But the velocity of the pulſes will increaſe in the ſubduplicate ratio of the diminiſhed quantity of matter, that is, in the ſubduplicate ratio of 11 to 10, or in the entire ratio of 21 to 20, (as he has ſhewn, Princip. Prop. 48. lib. II.) Therefore, if we ſay, as 20 : 21 : : 1088 : 1142; whence the real velocity of ſound (thus inveſtigated from the nature of elaſtic air by our great author) is at length found to be at the rate of 1142 feet per ſecond.

The truth and accuracy of this noble theory have been ſufficiently confirmed by experiments, particularly thoſe made by the late Rev. Dr. Derham, of which we ſhall give ſome account by and by; but will firſt lay before the reader a view of the different eſtimates made of the velocity of ſound by ſeveral eminent philoſophers, as in the table following.

| | Feet per ſecond. |
|---|---|
| The honourable Mr. Roberts | 1300 |
| The honourable Mr. Boyle | 1200 |
| Mr. Walker | 1338 |
| Merſennus | 1474 |
| The academy at Florence | 1148 |
| Royal academy at Paris | 1172 |
| Sir Iſaac Newton, Flamſtead, Halley, and Derham | 1142 |

As no man ever had a better opportunity, ſo none could improve it with greater diligence, aſſiduity, and accuracy, in determining and ſettling the various phænomena of ſounds, than the ſo often celebrated philoſopher laſt mentioned. He proved by experiments made with the ſtrokes of a hammer, and the exploſion of a gun at the ſame time, at the diſtance of a mile, that the velocity of ſounds produced from different bodies was the ſame, or came to his ear in the ſame time.

That the motion of ſound was equable and uniform, or that it paſſed through ſpaces proportional to the times, he found by various experiments made by the exploſion of guns, at different diſtances, as appears by the following table which he has given us, where the firſt column ſhews the places at which the guns were fired; the ſecond, the number of vibrations of an half-ſecond pendulum; the third, the diſtance of places in miles and decimal parts, as meaſured by trigonometry; the fourth, the diſtances meaſured by the velocity of ſound, admitting it to be at the rate of one mile every $9\frac{1}{4}$ half-ſeconds.

| | | | |
|---|---|---|---|
| At Hornchurch, — | 9 | 0.9875 | |
| North Okenden church | $18\frac{1}{2}$ | 2,004 | 2,000 |
| Upminſter-mill, — — | $22\frac{1}{2}$ / 23 | 2,4 | 2,4 / 2,48 |
| Little Warley church — | $27\frac{1}{2}$ | 3,0 | 2,97 |
| Rainham church, — | $33\frac{1}{4}$ | 3,58 | 3,59 |
| Alvel-mill, — — | 33 | 3,58 | 3,57 |
| Dagenham-mill, — | 35 | 3,85 | 3,78 |
| Southweal church, — | 45 | 4,59 | 4,86 |
| Eaſt Thornden church, | $46\frac{1}{2}$ | 5,09 | 5,03 |
| Barking church, — | $70\frac{1}{2}$ | 7,7 | 7,62 |
| Guns at Blackheath | 116 | 12,5 | 12,55 |

The great exactneſs of meaſuring diſtances by ſounds appears from the above table, as well as the equability of the motion; but to render this matter ſtill more certain and indiſputable, the Doctor took a journey to Foulneſs ſands, on the coaſt of Eſſex, which form a ſmooth large plain for miles. On this plain he meaſured ſix miles in a right line, and, cauſing a gun to be fired at the end of each mile, he found that his former obſervations were very juſt and true, and that ſound paſſed the firſt mile in $9\frac{1}{4}$ half ſeconds, two miles in $18\frac{1}{2}$, three miles in $27\frac{1}{4}$, and ſo on to the end of the ſix.

The Academia del Cimento made experiments of this ſort, from which they concluded, that the velocity of ſounds was ſo far equable, as not to be accelerated or retarded by conſpiring or adverſe winds; but in this they led themſelves and many others into a very great miſtake, which was owing to their firing of guns at too near a diſtance; for in great diſtances the difference is ſenſible.

SOUND, in muſic. The principal affection of

of found, whereby it becomes fitted to produce harmony, and raife agreeable fenfations, is that whereby it is diftinguifhed into acute and grave; the caufe of which appears to be no other than the different velocity of the vibrations of the founding body. See the articles HARMONY, TUNE, &c.

SOUND, in geography, denotes in general any ftreight, or inlet, of the fea, between two head-lands. However, the name found is given, by way of eminence, to the ftreight between Sweden and Denmark, joining the german Ocean to the Baltic, being about four miles over.

SOUND-BOARD, in an organ, is a refervoir into which the wind, drawn in by the bellows, is conducted by a port-vent, and hence diftributed into the pipes placed over holes in its upper part: this wind enters them by valves, which open by preffing upon the ftops or keys; after drawing the regifters, which prevent the air from entering any of the pipes, except thofe it is required in.

SOUNDING, in navigation, is the trying the depth of the water, and the quality of the bottom, either by an inch or three-quarter rope, with a deep fea-lead at the end of it. The founding line or rope, is marked at two, three and four fathoms, with a piece of black leather betwixt the ftrands; and, at five fathoms, with a piece of white leather, or cloth. The plummet, or lead, is ufually in the form of a nine-pin, and weighs eighteen pounds; and its lower end is frequently greafed, to know whether the bottom is fandy, rocky, &c. Near banks, fhores, &c. they found continually.

SOUP, or SOOP, a kind of pottage made of bread and broth, or the juice of flefh, or fome other matters, ufually ferved at the beginning of a meal.

Soup is efteemed effential to a french dinner, fometimes they heighten the relifh by the addition of onions, or leeks, or cabbage, &c.

SOURCE. See the article SPRING.

SOURIS, in the manege, is a cartilage in the noftrils of a horfe, by means of which he fnorts.

SOUTH, in cofmography, one of the four cardinal points. See the article COMPASS.

SOUTHAM, a market-town of Warwickfhire, fituated feven miles fouth eaft of Warwick.

SOUTHAMPTON, a borough and port-town of Hampfhire, fituated on a bay of the englifh channel, twelve miles fouth-weft of Winchefter. It fends two members to parliament.

SOUTHERN-WOOD, *abrotanum*, in botany, a fpecies of artemifia. See the articles ABROTANUM and ARTEMISIA.

Southern-wood is an attenuant, and is ferviceable in all obftructions of the vifcera, and in deftroying worms. It is recommended in fuppreffions of urine, a dram of it in powder for a dofe; and a decoction of it is in repute with fome as a lotion for the recovering hair upon the head when fallen off; others recommend its juice as a great cleanfer and healer of old ulcers.

SOUTHMOULTON, a market-town of Devonfhire, fituated twenty-four miles north-weft of EXETER.

SOUTHPETHERTON, a market-town of Somerfetfhire, fituated twenty-two miles fouth of Wells.

SOUTHWARK, a borough of Surry, and a fuburb to London, with which it has a communication by a magnificent bridge. It is fituated on the fouth fide of the Thames, and fends two members to parliament.

SOUTHWELL, a market-town of Nottinghamfhire, fituated eight miles north-eaft of Nottingham.

SOUTHWOULD, a port-town of Suffolk, fituated on a bay of the german Sea, forty-two miles eaft of Bury.

SOUVIGNY, a town of France, in the province of Lyonois, and territory of Bourbonois, fituated fifty miles fouth-eaft of Bourges.

SOW, in zoology, the female of the hog-kind. See the article HOG.

SOW, in the iron-works, the name of the block or lump of metal they work at once in the iron-furnace. The fize of thefe fows of iron is very different, even from the fame workmen, and the fame furnace. Thefe furnaces having fand-ftones for their hearths and fides up to the height of a yard, and the reft being made of brick, the hearth by the force of the fire is continually growing wider, fo that if it at firft contains as much metal as will make a fow of fix or feven hundred weight, it will at laft contain as much as will make a fow of two thoufand weight.

SOWING, in hufbandry, &c. See the articles SEED, SEMINATION, &c.

One great article in fowing to advantage, Mr. Tull obferves, is to know exactly at what depth the feed may be laid without danger of burying it. Seed is faid to be buried, when it is laid at a depth below

below what it is able to come up at. Different sorts of seeds come up at different depths, some six inches and more, and others will not bear to be buried more than half an inch. For coming at an accurate knowledge of the depth at which every seed will come up best from the sowing, Mr. Tull proposes to make gages; for the method of conducting which we refer the reader to his own account of it, in page 58, of his Horse-hoeing husbandry.

However, it is to be observed, that it is not proper to sow the seeds of all plants at the greatest depths at which they will come up; for it may be so deep as that the wet may rot or chill the first root, as is the case with wheat in moist land. The nature of the land, and the manner how it is laid, either flat or in ridges, and the season of sowing, with the experience of the husbandman, must determine the proper depths for different sorts of seed.

The quantity of seed is to be different also, according to the manner of the sowing. The proper quantity to be drilled on an acre is much less than must be sown in the common way, not because hoeing will not maintain as many plants as the other, for on the contrary, it will maintain many more; but the difference is upon many other accounts, as that it is impossible to sow it so even by hand as the drill will do. For let the hand spread it never so exactly, which yet is difficult enough to do with some seeds in windy weather, yet the unevenness of the ground will alter the situation of the seeds, the greatest part of them rebounding into holes, and the lowest places; or else the harrows, in covering, drawing them down thither; so that these low places may have ten times too much seed, and the high places may have little or none of it; and this inequality lessens in effect the quantity of the seed, because fifty seeds in room of one will not produce so much as one will do, and where they are too thick, they cannot be well nourished, their roots not spreading to near their natural extent, for want of hoeing, to open the earth and give them way.

The distances of the rows is one extremely material point in the obtaining a good crop; but as a much larger distance is to be allowed in these than common practice has been used to, it is very difficult to persuade the farmer to venture a trial at such distances as he may have experience from.

SOWNE, a term used in the exchequer, where estreats that sowne not, are such as the sheriff by his care and diligence cannot levy, wherefore they are not regarded; and the estreats that sowne, are such as he may levy.

SPA, or SPAW, a town of Germany, in the circle of Westphalia, and bishopric of Liege, situated seventeen miles south-east of Liege, famous for its mineral waters ever since the time of the Romans, of which there are still great quantities sent abroad to all parts of Europe.

Spaw waters are the lightest and most subtile of all the mineral waters, as is proved by several experiments, and the small quantity of earth, and the large portion of subtile mineral spirit they contain, bespeak their possessing the most exalted virtues of all the other mineral waters. One very remarkable virtue of this water is, that it greatly relieves in all disorders of the kidneys, ureters and bladder, whether occasioned by stone, gravel, or ulcerations. It possesses, beside, all the virtues of the other mineral waters, and is of the greatest service in edulcorating sharp, and dividing viscous, humours, and removing all diseases arising from these causes, by disposing them to pass off by proper emunctuories. See the article MINERAL *water*.

These waters drank at the spring, cause a sort of drunkenness, which does not last above a quarter of an hour; when carried to any distant place, though ever so well stopped down, they will always, after some time, precipitate a small quantity of a yellow ochreous earth; mixed with milk, they do not coagulate it, but when mixed with wine, make a great ebullition, and throw up a large quantity of air-bubbles, with a peculiarly pleasing smell.

SPACE, *spatium*, is defined by Mr. Locke, to be a simple idea, which we attain both by our sight and touch. The modes whereof are distance, capacity, extension, duration, &c. See the articles DISTANCE, CAPACITY, &c.

Space considered barely in length, between two bodies, is the same idea which we have of distance. If it be considered in length, breadth, and thickness, it is properly called capacity; when considered between the extremities of matter which

fills

fills the capacity of ſpace, with ſomething ſolid, tangible, and moveable, it is then called extenſion, ſo that extenſion is an idea belonging to a body, but ſpace, it is plain, may be conceived without it. Each different diſtance is a different modification of ſpace, and each idea of any different ſpace is a ſimple mode of this idea: ſuch are an inch, foot, yard, &c. which are the ideas of certain ſtated lengths, which men ſettle in their minds for the uſe, and by the cuſtom of meaſuring. When theſe ideas are made familiar to mens thoughts, they can repeat them as often as they will, without joining to them the idea of body, and frame to themſelves the ideas of feet, yards, or fathoms, beyond the utmoſt bounds of all bodies, and by adding theſe ſtill one to another, enlarge their idea of ſpace as much as they pleaſe. From this power of repeating any idea of diſtance without ever coming to an end, we come by the idea of immenſity. See the article IMMENSITY.

Another modification of ſpace is taken from the relation of the termination of the parts of extenſion, or circumſcribed ſpace, amongſt themſelves; and this is what we call figure. This the touch diſcovers in ſenſible bodies, whoſe extremities come within our reach; and the eye takes, both from bodies and colours, whoſe boundaries are within its view; where obſerving how the extremities terminate, either in ſtreight lines, which meet at diſcernible angles; or in crooked ones, wherein no angles can be perceived: by conſidering theſe as they relate to one another in all parts of the extremities of any body or ſpace, it has that idea we call figure, which affords to the mind infinite variety. See FIGURE.

Another mode belonging to this head is, that of place. See the article PLACE.

There is another mode of ſpace, the idea of which we get from the fleeting and perpetually periſhing parts of ſucceſſion, which we call duration. See the article DURATION.

Space is uſually divided into abſolute and relative. Abſolute ſpace is that conſidered in its own nature, without regard to any thing external, which always remains the ſame, and is infinite and immoveable.

Relative ſpace, is that moveable dimenſion, or meaſure of the former, which our ſenſes define by its poſitions to bodies within it, and this is the vulgar uſe for immoveable ſpace.

Relative ſpace in magnitude and figure, is always the ſame with abſolute; but it is not neceſſary it ſhould be ſo numerically; as if you ſuppoſe a ſhip to be, indeed, in abſolute reſt, then the places of all things within her will be the ſame, abſolutely and relatively, and nothing will change its place: but ſuppoſe the ſhip under ſail or in motion, and ſhe will continually paſs through new parts of abſolute ſpace; but all things on board, conſidered relatively in reſpect to the ſhip, may be, notwithſtanding, in the ſame places, or have the ſame ſituation and poſition in regard to one another.

Proper and abſolute motion is defined to be the application of a body to different parts of abſolute, that is, infinite and immoveable ſpace. The carteſians, who maintain extenſion the eſſence of matter, aſſert, that the ſpace any body takes up is the ſame thing with the body itſelf; and that there is no ſuch thing as mere ſpace void of all matter in the univerſe. See CARTESIAN and VACUUM.

SPACE, in geometry, denotes the area of any figure, or that which fills the interval or diſtance between the lines that terminate it.

SPACE, in mechanics, the line a moveable body, conſidered as a point, is conceived to deſcribe by its motion.

SPADE, an inſtrument for digging up the ground, the handle or ſhaft whereof is about three feet long; the head is all of iron; the upper part being flat for the workman to ſet his foot on, to force it into the ground; the length of the head is about a foot or fifteen inches, and the breadth ſix or eight.

SPAGIRIC ART, *ars ſpagirica*, a name given by authors to that ſpecies of chemiſtry which works on the metals, and is employed in the ſearch of the philoſopher's ſtone.

SPAHI'S, horſemen in the ottoman army, chiefly raiſed in Aſia. The great ſtrength of the grand ſeignior's army conſiſts in the janizaries, who are the foot, and the ſpahi's, who are the horſe.

SPAIN, including Portugal, is a large peninſula of Europe, lying between 10° weſt and 3° eaſt longitude, and between 36° and 44° north latitude, being about ſeven hundred miles in length from eaſt to weſt, and about five hundred in breadth from north to ſouth: it is bounded by the

the bay of Bifcay, on the north; by the Pyrenean mountains, which feparate it from France, on the north-eaft; by the Mediterranean-fea, on the fouth-eaft; and by the Atlantic-ocean, on the weft. See the article PORTUGAL.

The kingdom of Spain, confidered feparately from Portugal, comprehends fourteen provinces, each of which may be feen under its proper name.

*New* SPAIN. See the article MEXICO.

SPALATRO, a city and port-town of Dalmatia, fituated on the gulph of Venice: eaft. long. 17° 45′, north latitude 43° 16′.

SPALDING, a market-town of Lincolnfhire, fituated under the meridian of London, thirty miles fouth-eaft of Lincoln.

SPAN, a meafure taken from the fpace between the thumb's end and the tip of the little finger, when both are ftretched out. The fpan is eftimated at three hand's breadths, or nine inches. See MEASURE.

SPANDAW, a town of Germany, in the circle of Upper Saxony, and marquifate of Brandenburg, fituated on the river Havel, eight miles north-weft of Berlin.

SPANIEL, in zoology, a fpecies of the canis or dog kind. See CANIS.

There are two forts of fpaniels which neceffarily ferve for fowling: the firft of thefe finds game on land, and the other on the water. Such fpaniels as play their parts by land, do it either by fwiftnefs of foot, by fpringing the bird, or by difcovering to the fowler, by fome fecret fign, the place where the game lights; they ferve the hawk and the net, or train. See the article SETTING.

The water-fpaniel, partly by natural inclination, and partly by being well trained, has recourfe to the water for his game and by this means moft of the water-fowl are taken. The fize of this fpaniel is fomewhat larger than the other, but he is generally remarkable for long rough curling hair, which muft be clipped at proper times, to render him more light for fwimming.

SPAR, in natural hiftory, a clafs of foffils, not inflammable nor foluble in water; when pure, pellucid and colourlefs, and emulating the appearance of cryftal, but wanting its diftinguifhing characters; compofed of plane and equable plates, not flexile nor elaftic; not giving fire with fteel; readily calcining in a fmall fire, and fermenting violently with acids, and wholly foluble in them. See the article CRYSTAL.

The fpars, in general, are found in the fiffures of ftones, and about mines. Derbyfhire affords enough of them to fupply the whole world; and the german mines afford yet larger quantities.

If cryftal be fubject to a vaft variety of appearances, fo as to conftitute different orders and genera, fpar is much more fo, there being no lefs than ten orders of it. 1. The pellucid, cryftalliform and perfect fpars, compofed of a column terminated at each end by a pyramid. 2. Thofe compofed of two pyramids joined bafe to bafe, without any intermediate column. 3. The cryftalliform columnar fpars, adhering by one end to fome folid body, and terminated at the other by a pyramid. 4. The pyramidal cryftalliform fpars without columns. 5. The fpars of a parallelopiped form. The fpars externally of no regular form, but breaking into rhomboidal maffes. 7. The cruftaceous fpars; thefe are of a cryftallino-terrene ftructure, or debafed from their native pellucidity by an admixture of earth, and formed into plates or crufts of a ftriated figure within. 8. The cruftaceous terrene fpars; bodies fo highly debafed with earth, as to appear merely earthy, of an irregular ftructure, and not ftriated within: thefe often encruft fiffures of ftone and fometimes vegetable and other extraneous bodies in fprings. 9. The fpars formed into oblong cylindric bodies, known by the name of ftalactitæ, or ftony icicles. 10. The fpars formed into fmall round figures, compofed of various crufts enclofing one another, and generally known by the name ftalagmitæ: and adding to thefe the fpars, influenced in their figures by metalline particles, we have the whole feries of thefe bodies, *viz.* 1. The cubic fpars, owing their figure to lead. 2. The pyramidal fpars, with four planes, owing their figure to tin. 3. The rhomboidal fpars, confifting of fix planes, owing their figure to iron.

For medicinal ufe, the pureft and moft pellucid fpars fhould be chofen: thefe perfectly diffolve in acids, and are recommended in nephritic cafes. Some have ufed one kind, fome another, as the lapis judaicus, the fparry incruftations of caverns, petrified oyfter-fhells, and water in which large quantities of fpar are fuftained. After all, the nephritic virtues of fpar want fufficient proof; fome even fufpect its ufe to be more hurtful than beneficial.

It were to be wifhed, that whoever attempts to afcertain this point, would

choose for the experiment some determinate kind of spar in its natural form, rather than under appearances, whereby its efficacy may be confounded with that of other bodies.

SPARADRAP, *sparadrapum*, in pharmacy, &c. a sort of cere-cloth, called also tela Gualteri, the form whereof is directed as follows. Take of the diapalma plaister, and diachylon with the gums, each one pound; cerufs, half a pound; root of orris finely powdered, an ounce and a half. Mix these together, and whilst they are in fusion, dip them in soft worn-out linen rags, so that they may be covered with the plaister on each side; then take them out, spread them, and let them dry; and smooth the surfaces with a knife or spatula. The principal use of these is for issues.

SPARAGUS, or ASPARAGUS, in botany. See the article ASPARAGUS.

SPARGANIUM, COMMON BUR-REED, in botany, a genus of the monoecia triandria class of plants, having no corolla; the male and female flowers have a roundish amentum; the calyx of the male is formed of two leaves, and that of the female of three; the fruit is a dry drupe, turbinated with a point, and angulated underneath; the seeds are two osseous, oblongo-ovated and angulated nuts.

The root of this plant is recommended by Dioscorides as excellent against the poison of serpents, when taken in wine.

SPARRING, among cock-fighters, is the fighting a cock with another to breathe him. In sparring they put hotts on their spurs that they may not hurt one another. See the article HOTTS.

To spar the cock in general, signifies to breathe him, in order to embolden him to fight.

SPARROW, *passer*, in ornithology, a species of the fringilla. See FRINGILLA.

The common sparrow is the brown fringilla, with a black throat and brown temples. It is larger than the linnet, and the male is an erect and handsome bird; the head is large, the eyes small, and the beak short; the wings are short, and the tail short and forked.

The reed sparrow, or the fringilla with a black head brown at the sides, and with a white ring round the neck, and a mottled black and white breast, is a very beautiful and singular bird, of the size of the common linnet; the head is small and depressed, the beak short and black, and the eyes hazel; and in most other particulars it corresponds with the common sparrow. See plate CCLVI. fig. 4. where n° 1. represents the cock, and n° 2. the hen.

SPARROW-HAWK, in ornithology, the yellow-legged falco with a white undulated breast, and a fasciated brown tail. See the articles FALCO and HAWK.

This bird is about the bigness of a pigeon, but considerably longer bodied, in proportion to its thickness; its wings, when expanded, measure twice the length of the body and tail; the tail is short but very strong, thick at the base, very sharp at the point, and considerably hooked; the head is small, somewhat flatted, and of a brownish colour; the eyes are as it were sunk in the head, and their iris is yellow and bright.

SPARSE LEAVES, among botanists, leaves which are placed irregularly over the several parts of the plant.

SPARTEL CAPE, a promontory of the coast of Barbary, at the entrance of the straits of Gibraltar.

SPARTIUM, SPANISH-BROOM, in botany, a genus of the diadelphia-decandria class of plants, the corolla whereof is papilionaceous, and the fruit is a long, cylindric, obtuse pod of two valves: the seeds are numerous, globose, and kidney-shaped. See plate CCLVII. fig. 2.

SPARTIUM is also Tournefort's name for the genista of Linnæus, as genista is Linnæus's name for Tournefort's spartium. See the article GENISTA.

SPARTIVENTO CAPE, the most southern point or promontory of Italy, situated in east long. 16° 30′, north lat. 38° 20′.

SPARUS, in ichthyology, the name of a genus of fish of the order of the acanthopterygii, the characters of which are, that the coverings of the gills are scaly, with lips covering the teeth in the same manner as in quadrupeds; the teeth themselves are either like those of the human head, or like those of a dog; the molares are like those of quadrupeds; the teeth stand only in the jaws and fauces; the palate and the tongue are smooth; there is only one back-fin; the tail is forked, and the eyes covered with a lax skin.

SPASM, *spasma*, or *spasmus*, in medicine, a convulsion.

A spasm, according to Hoffman, may be universal or particular, salutary or morbous. An universal spasm happens if the whole vascular genus, chiefly the heart and arteries, as also the fibres of the

the fyftem, are affected, and there is a preternatural conftriction therein, whereby the fyftole and diaftole are increafed, and the progrefs of the blood accelerated; this conftitutes a fever, whereof a frequent pulfe is the moft certain fign. The other kind of fpafms is particular, and affects only one part of the body, which it conftringes, and intercepts the free progrefs of the blood, rendering it unequal, and fending it in greater plenty to the other parts of the body. But particularly this fpaftic affection affects the nervous and membranous parts, fuch as the ftomach, and the whole volume of the inteftines; whence proceed the hyfteric and hypochondriac paffions. A fpafm is likewife prefent in hæmorrhages, congeftions of the blood, and unequal flux of the fluid in all anxieties and fuppreffed excretions. See HYPOCHONDRIAC, HYSTERICS, HÆMORRHAGE, *&c.*

If a violent fpafm happens to affect the dura mater, an epilepfy or univerfal convulfion follows; and convulfive motions of the membranes and nerves have their origin from the medulla fpinalis. A fpafm is falutary when it deftroys the caufe of the difeafe, by taking away the ftagnation of the humours, correcting acid cauftics, and promoting the excretion of the morbid matter; but it is very pernicious when it conftringes the fkin and all the excretory veffels, detaining the morbous matter therein, and forcing it upon the vital parts. The caufes and treatment of fpafms in general, have already been treated of under the articles CONVULSION and CONVULSIVE DISORDERS.

In a fpafm of the lower jaw, when the patient can neither open his mouth nor eat; as when perfons are wounded, and fomething foreign is lodged therein, or when the nerves are hurt, or when fharp things, fuch as vitriol, are applied to ftop the blood, the cure muft be performed according to the diverfity of the caufes as particularly treated of in furgery; but when this happens fpontaneoufly in infants, it is obferved that they generally die, though the beft nervous and antifpafmodic medicines be ufed.

In the cynic fpafm, or as it is otherwife called, the fardonian laughter, if it proceeds from poifons, as it generally does, efpecially hemlock or oenanthe, Heifter directs that they be expelled immediately from the body by a vomit; then giving generous wines, warm with ginger or pepper, as was the practice of the antients. If it happens from other caufes, it muft be treated with antifpafmodics and nervous medicines, both inwardly and outwardly, and chiefly with plafter of betony and bayberries prepared with oil of amber, and applied to the temples, and behind the ears.

For that fpecies of the convulfion called cramp, fee the article CRAMP.

SPASMODIC, fomething belonging to a fpafm or convulfion. See the laft article.

SPATHA, a word ufed by different authors in various fenfes; among botanifts it expreffes that fort of cup which confifts of a fimple membrane growing from the ftalk; this kind of cup is of various figures, often diphyllous, or divided into two parts; often fimple; fometimes more divided: it inclofes fometimes a fingle flower, fometimes feveral flowers together, and thefe have often no perianthium; the fpatha is of very different texture and confiftence in different plants. See plate CCLVIII. fig. 1.

Some authors, by this word, exprefs a rib; others, the chirurgical inftrument called fpatula; others, a fort of incifion-knife, and by others, it is taken for a fword, this laft being, indeed, its proper fignification, and all the reft being only metaphorical applications of it to different things, which bear fome refemblance to a fword.

SPATULA, or SPATHULA, an inftrument ufed by furgeons and apothecaries. This inftrument is made of different fhapes, according to the various ufes of it: that marked n° 1. plate CCLVI. fig. 5. is ufed to deprefs the tongue in order to examine the ftate of the tonfils, uvula and fauces, when they are affected with any diforders: it is alfo ufed to fufpend the tongue when the frenum is to be divided, for which purpofe it has a fiffure at its extremity, and fhould therefore be made of filver rather than any other metal; thofe marked n° 2. and 3. *ibid.* are chiefly ufed in fpreading plafters, ointments, and cataplafms, and fometimes with their fulcated extremity they are of fervice in raifing up fractured bones of the cranium.

SPAVIN, in the menage, a difeafe in horfes, being a fwelling or ftiffnefs ufually in the ham occafioning a lamenefs. There are two kinds of fpavins, *viz.* the ox-fpavin, which is a callous tumour at the bottom of the ham on the infide, hard as a bone, and very painful; while it is yet recent, fome

ſome only halt with it at the firſt coming out of the ſtable : the other, which is the dry ſpavin, is more eaſily perceived by the horſe's raiſing one of his hind legs with a twitch higher than the other; but ſometimes it is found on both legs. This kind, which ſome alſo call ſtringhalt, frequently degenerates into the oxſpavin, for which there is no remedy but to apply the fire, and even this is not always ſuccefsful.

There are two other kinds of ſpavin which have their ſeat in the hoof, *viz.* the blood-ſpavin, being a ſoft tumour which grows through the horſe's hoof, and is uſually full of blood; the other is the bone-ſpavin, being a cruſty ſubſtance growing on the inſide of the hoof under the joint.

SPAW, or SPA. See the article SPA.

SPAYING, or SPADING, the operation of caſtrating the females of ſeveral kinds of animals, as ſows, bitches, &c. to prevent any further conception, and promote their fattening.

It is performed by cutting them in the mid flank, on the left-ſide, with a ſharp knife or lancet, taking out the uterus and cutting it off, and ſo ſtitching up the wound, anointing the part with tar, and keeping the animal warm for two or three days. The uſual way is to make the inciſion aſlope two inches and a half long, that the fore-finger may be put in towards the back to feel for the ovaries, which are two kernels as big as acorns on both ſides of the uterus, one of which is drawn to the wound, the ſtring thereof cut, and thus both taken out.

SPEAKER *of the houſe of commons*, a member of the houſe elected by a majority of the votes thereof, to act as chairman or preſident in putting queſtions, reading briefs or bills, keeping order, reprimanding the refractory, adjourning the houſe, &c. The firſt thing done by the commons, upon the firſt meeting of a parliament, is to chuſe a ſpeaker, who is to be approved of by the king, and who, upon his admiſſion, begs his majeſty that the commons, during their ſitting, may have free acceſs to his majeſty, freedom of ſpeech in their own houſe, and ſecurity from arreſts. The ſpeaker is not allowed to perſuade or diſſuade in paſſing a bill, but only to make a ſhort and plain narrative; nor to vote unleſs the houſe be equally divided. See PARLIAMENT.

The lord chancellor or keeper is uſually ſpeaker of the houſe of lords; the ſpeaker of the convocation is called the prolocutor. See the article PROLOCUTOR.

SPEAKING, the art or act of expreſſing one's thoughts in articulate ſounds or words.

SPEAKING TRUMPET. See TRUMPET.

SPEAR, in the menage. The feather of a horſe, called the ſtroke of the ſpear, is a mark in the neck or near the ſhoulders of ſome barbs and ſome turky and ſpaniſh horſes, repreſenting the blow or cut of a ſpear in theſe places, with ſome reſemblance of a ſcar; this feather is an infallible ſign of a good horſe.

SPECIAL, ſomething that is particular, or has a particular deſignation, from the Latin *ſpecies*, in oppoſition to general from *genus*. See GENERAL, &c.

SPECIAL *matter in evidence*, in law, denotes that which is alledged ſpecially, and does not come into the general iſſue.

SPECIALTY, is uſed for a bond, bill, or other deed or inſtrument executed under the hand and ſeal of the parties thereto.

SPECIES, in logic, a relative term, expreſſing an idea which is comprized under ſome general one, called a genus, See the article GENUS.

The idea of a ſpecies is formed, by adding a new idea to the genus : thus if the genus be a circumſcribed ſpace, and we ſuppoſe this circumſcription to be by lines, we ſhall obtain the notion of that ſpecies of figures which are called plain figures; but if we conceive the circumſcription to be by ſurfaces, we get an idea of the ſpecies of ſolid figures. This ſuperadded idea is called the ſpecific difference, not only as it ſerves to diſtinguiſh the ſpecies from the genus; but becauſe being different in all the ſeveral ſubdiviſions, we thereby alſo diſtinguiſh the ſpecies one from another : and as this ſuperadded conception completes the notion of the ſpecies, it is plain that the genus and ſpecific difference are the proper and conſtituent parts of the ſpecies. If we trace the progreſs of the mind ſtill farther, and obſerve it advancing through the inferior ſpecies, we ſhall find its manner of proceeding to be always the ſame; ſince every lower ſpecies is formed, by ſuperadding ſome new idea to the ſpecies next above : thus if animal be the genus, by ſupperadding the notion of four limbs, we obtain the idea of quadrupeds; if to this we add farther, the peculiar form and characters which diſtinguiſh mankind, we get the idea of the human ſpecies;

cies; and by adding the peculiarities which diftinguifh a particular perfon from all others, we form the notion of an individual, which is called the laft fpecies, or fpecies fpecialiffimum.

For the ufe of the genus, fpecies, and fpecific difference in defining things, fee the article DEFINITION.

SPECIES, in logic, is one of the five words called by Porphyry univerfals. See the article UNIVERSAL.

SPECIES, in rhetoric, is a particular thing, contained under a more univerfal one.

SPECIES, in optics, the image painted on the retina, by the rays of light reflected from the feveral points of the furface of an object. See the article VISION.

SPECIES, in commerce, are the feveral pieces of gold, filver, copper, &c. which having paffed their full preparation and coinage are current in public. See the article COIN.

SPECIES, in algebra, the characters or fymbols made ufe of to reprefent quantities. See the article CHARACTER.

SPECIES, in pharmacy, denotes the ingredients of a compound medicine, as the diafcordium in a dry form, or only reduced powder. See DIASCORDIUM.

The fpecies aromaticæ, according to the Edinburgh-difpenfatory, confift of equal parts of canella, leffer cardamom-feeds, mace and ginger, reduced to powder: but the college of phyficians, London, order them to be made of cinnamon, two ounces; and leffer cardamom-feeds hufked, ginger and long pepper, of each one ounce, all beat together into a powder. Both thefe compofitions are agreeable, hot, fpicy medicines; and as fuch may be ufefully exhibited in cold phlegmatic habits and decayed conftitutions, for warming the ftomach, promoting digeftion, and ftrengthening the tone of the vifcera in general. The dofe is from ten grains to a fcruple and upwards.

*Change of* SPECIES, in hufbandry, is the fowing firft one kind of plant, then another, and then a third, and fo on, upon the fame land: by this means the moft is made of the foil; and it is found, when it will no longer give a good crop of the firft corn planted on it, that it will ftill give a good one of fome other fpecies; and, finally, of peafe after all. After this laft change of fpecies, it is found neceffary, in the common method of hufbandry, to renew the land with fallowing and manure, in order to its producing any thing again.

SPECIFIC, in philofophy, that which is peculiar to any thing, and diftinguifhes it from all others.

SPECIFIC, in medicine, a remedy whofe virtue and effect is peculiarly adapted to fome certain difeafe, is adequate thereto, and exerts its whole force immediately thereon.

The illuftrious Hoffman has given a curious account of fpecific medicines, but it is too long to be inferted here.

SPECIFIC GRAVITY, is that by which one body is heavier than another of the fame dimenfion, and is always as the quantity of matter under that dimenfion. See the article GRAVITY.

As to the method of finding the fpecific gravities of bodies, fee the articles HYDROMETER and HYDROSTATICAL BALANCE.

SPECILLUM, in furgery, the fame with fpeculum. See SPECULUM.

SPECIOUS ARITHMETIC, the fame with algebra. See the article ALGEBRA.

SPECTACLES, in dioptrics, a machine confifting of two lenfes, fet in filver, horn, &c. to affift the defects of the organ of fight. See LENS.

Old people, and others who have flat eyes, ufe convex fpectacles, which caufe the rays of light to converge fo as to fall upon the retina: whereas myopes, or fhort-fighted perfons, ufe concave lenfes for fpectacles, which caufing the rays to diverge, prevent their meeting ere they reach the retina. The convexity or concavity of the glaffes, fuited to the different degrees of flatnefs or convexity of people's eyes, is beft determined by trial; obferving only to ufe thofe glaffes which are the leaft convex or concave of any, that will fit the eye: for fince they cannot be put quite clofe to the eye, the lefs any glafs is convex or concave, the lefs it will magnify or diminifh the pictures of objects upon the retina. See the articles VISION and MYOPIA.

Were there no other ufe of dioptrics than that of fpectacles for defective eyes, the advantage that mankind receives thereby is certainly inferior to none other whatfoever, that is not abfolutely requifite to the fupport of life; for as the fight is the moft noble of all our fenfes, furely that inftrument that relieves the eyes when decayed, and fupplies their defects, rendering them ufeful when otherwife almoft ufelefs, muft needs, of all others, be efteemed of the greateft advantage.

The antients knew nothing of ſpectacles, the invention of which is ſaid to have been about the year 1300.

Spectacles without caſes, pay, on importation, a duty of 6 s. 7 $\frac{65}{100}$d. for each groſs, containing twelve dozen; and draw back, on exportation 5 s. 2$\frac{75}{100}$ d.

SPECTRE-SHELL, *concha ſpectrorum*, a ſpecies of voluta, variegated with ſeveral reddiſh faſciæ or bands. See the article VOLUTA.

SPECULARIS LAPIS, in natural hiſtory, a genus of talcs compoſed of large plates viſibly ſeparate, and of extreme thinneſs; and each fiſſile again ſeparated into a number of plates ſtill finer. See TALC.

Of this genus there are three ſpecies: 1. The white ſhining ſpecularis, with large and broad leaves, commonly called iſinglaſs and muſcovy-glaſs: its lamellæ, or leaves, are extremely thin, elaſtic, and tranſparent; it makes not the leaſt efferveſcence with aqua fortis, and is not eaſily calcined in the fire. It is imported in great quantities; the miniature painters cover their pictures with it; the lantern-makers ſometimes uſe it inſtead of horn; and minute objects are uſually preſerved between two plates of it, for examination by the microſcope. 2. The bright brown ſpecularis, with broad leaves; a very valuable ſpecies, though inferior to the former. 3. The purple bright ſpecularis, with broad leaves; which is the moſt elegant of all the talcs, and not leſs beautifully tranſparent than the firſt kind.

SPECULATIVE, ſomething relating to the theory of ſome art or ſcience, in contradiſtinction to practical. See THEORY.

SPECULUM, a LOOKING-GLASS, or MIRROUR, capable of reflecting the rays of the ſun, &c. See the articles MIRROUR, LIGHT, REFLECTION, &c.

SPECULUM, in ſurgery, an inſtrument for dilating a wound, or the like, in order to examine it attentively.

Theſe ſpecula are of different figures, according to the parts they are intended to ſearch: 1. The ſpeculum ani (plate CCLVIII. fig. 2. n° 1.) ſerves to dilate and inſpect the anus, vagina, and uterus, in diſorders of theſe parts; it conſiſts of a hollow cone or beak, whoſe two ſides are marked A A and B B, which, being gently warmed and lubricated with oil, are then preſſed into the anus or vagina; and by preſſing together the two handles C and D, the ſides of the cone are thereby gradually ſeparated, and dilate the parts for inſpection: the hinge E, is in manner of a ginglymus. 2. The ſpeculum oculi, the deſcription and uſe of which may be ſeen under the article COUCHING. 3. The ſpeculum oris, for inſpecting the mouth, is almoſt like a pair of forceps; A (*ibid.* n° 2.) being the part that depreſſes the tongue, while the parts B, B, elevate the dentes inciſores of the upper jaw, by preſſing the handles C, C, together. *Ibid.* n° 3. is another ſpeculum oris, furniſhed with a ſcrew, to open the teeth in convulſions; A A being the parts interpoſed between the dentes inciſores, and which are opened by means of the ſcrew B.

SPEECH, in general, the art or act of expreſſing a perſon's thoughts, by means of articulate ſounds, which we call words. See the article WORD.

Grammarians generally make eight parts of ſpeech, *i. e.* eight kinds of words, generally uſed in diſcourſe, *viz.* noun, pronoun, participle, adverb, prepoſition, interjection, and conjunction; each of which ſee under its proper article.

Others, particularly engliſh grammarians, refer all words to four general heads or claſſes, *viz.* 1. Such words as denote things actually exiſting, or their properties, which are called nouns or names, as *houſe*, *tree*, *man*, *horſe*, *convenient*, *large*, *&c.* 2. Such words as expreſs action or paſſion, as *I love*, *I am loved*; and theſe are called verbs or affirmations. 3. Such words as denote the manner or way of doing or ſuffering, as *ſwiftly*, *ſlowly*, *&c.* which are called adverbs. 4. Particles, or ſuch ſmall words as ſerve to connect others together, in forming a ſentence, as *and*, *or*, *alſo*, *before*, *after*, *&c.* See the articles PARTICLE, NOUN, VERB, *&c.*

SPEEDWELL, *veronica*, in botany. See the article VERONICA.

SPELL, in general, denotes the ſame with charm or amulet. See the articles CHARM and AMULET.

In the ſea-language, the word ſpell ſignifies to do any work for a ſhort time, and then leave it; therefore a freſh ſpell is when freſh men come to work; and to give a ſpell, is to work in another's room.

SPELLING, in grammar, that part of orthography which teaches the true manner of reſolving words into their ſyllables, See the article ORTHOGRAPHY.

All words are either ſimple or compound, as

as *ufe, difufe*; *done, undone*: and the rules for dividing each, muft be fuch as are derived from the analogy of language in general, or from the eftablifhed cuftom of fpeaking; which, for the englifh language, are reduced to the following rules: 1. A confonant between two vowels muft be joined with the latter in fpelling, as *na-ture, ve-ri ly, ge-ne-rous*: except, however, the letter *x*, which is joined to the firft, as in *flax-en, ox-en, &c.* and compound words, as in *up-on, un-ufed, &c.* 2. A double confonant muft be divided, as in *let-ter, man-ner, &c.* 3. Thofe confonants which can begin a word, muft not be parted in fpelling, as in *de-fraud, re-prove, di-ftinct*: however, this rule is found fometimes to fail; for tho' *gn* begins a word, as *gnaw, gnat, &c.* yet it muft be divided in fpelling, as in *cog-ni-zance, ma-lig-ni-ty, &c.* 4. Thofe confonants which cannot begin a word muft be divided, as *ld* in *fel-dom*, *lt* in *mul-ti-tude*, *mp* in *tem-per*, *rd* in *ar-dent*; but, in final fyllables, there are exceptions, as *tl* in *ti-tle*, *dl* in *han-dle*, *&c.* 5. When both vowels come together, and are both of them diftinctly founded, they muft be feparated in fpelling, as in *co-e-val, mu-tu-al, &c.* 6. The grammatical terminations, or endings, muft be feparated in fpelling, as *ed* in *wing ed*, *edft* in *de-li-ver-edft*, *ing* in *hear-ing*, *ance* in *de-li-ver-ance*, *&c.* 7. Compound words muft be refolved into their fimple or component words, as *up-on, in-to, never-the-lefs, not-with-ftand-ing, &c.*

SPELTER, in natural hiftory, the fame with zink. See the article ZINK.

SPENT, in the fea-language, fignifies the fame as broken.

SPERGULA, SPURRY, in botany, a genus of the decandria-pentagynia clafs of plants, the flower of which confifts of five oval, concave, patent petals; and its fruit is an oval, covered, unilocular capfule, formed of five valves, and containing numerous rounded feeds, furrounded with an emarginated rim.

SPERM, σπερμα, the fame with feed. See the article SEED.

SPERMA-CETI, in pharmacy, a white flaky fubftance, prepared from the oil of a fpecies of whale, called by ichthyologifts catodon, by reafon it has teeth only in the under jaw. See CATODON.

The ignorance of the people who firft ufed this medicine, gave it a name which feemed to exprefs its being the femen of the whale; but it is, in reality, no more than a preparation of the oil, with which that fifh abounds.

Sperma-ceti is a fine, bright, white, and femi-pellucid fubftance, compofed of a fine furfuraceous fubftance, formed into oblong flakes, very light, foft, and unctuous to the touch, inflammable, foluble in oil, but not in watery menftrua; of fcarce any fmell, when frefh and fine, and of a foft, agreeable, and unctuous tafte. The largeft, firmeft, and whiteft flakes of it are to be chofen. It is liable to become rancid and yellowifh in keeping, and the fmaller fragments contract this bad quality fooner than the larger.

The fperma-ceti of the fhops was firft made from the head of this fifh; the oil obtained from its brain, and the diploe of the cranium, furnifhing all that we had of it; and hence the confiderable price it was long kept at. It was fome time after found out, however, that any whale-oil would do as well as this, which occafioned the price to fall confiderably. At prefent it is made in England from whale-oil of any kind, the fettlings of our oilmen's larger veffels particularly, which are boiled with a lixivium of a german pot-afh, or pearl-afhes, till white and firm; and after feveral other meltings, and a thorough feparation of what faline particles might have got into the matter, it is, when cold, cut out with knives into the flakes we fee it in. The procefs is eafy, but it requires care, and a nice infpection towards the end: if not enough boiled, it is apt to turn yellow, and foon grow rancid.

Sperma-ceti is, therefore oil of the animal kind, rendered very fweet, and fit for internal ufe. Its virtues are emollient and pectoral; it is good in coughs, and other diforders of the breaft; and excellent in external applications, fuch as liniments, and the like: it readily diffolves in oil, or other fatty fubftances, for the latter purpofes; and, for the former, it blends with the yolk of an egg, and after that mixture with an aqueous fluid, and makes a pleafant emulfion.

SPERMACOCE, in botany, a genus of the tetrandria-monogynia clafs of plants, the corolla whereof confifts of a fingle petal; the tube is cylindric, and longer than the cup; the limb is divided into four parts, patent, reflex, and obtufe; the fruit confifts of two oblong capfules, growing together, gibbous on one fide, plane on the other, and each of them having

having two horns or points; the seeds are single and roundish.

SPERMATIC, in anatomy, something belonging to the sperm or seed.

The spermatic vessels, called also vasa præparantia, are certain vessels appointed for bringing the blood to the testicles, &c. to be secreted and prepared into seed, and for carrying back again the blood remaining after the secretion is effected. The spermatic vessels are two arteries and as many veins. The spermatic arteries arise, by a very narrow origin, from the fore part of the trunk of the aorta, below the emulgents: their structure is very singular, in that, contrary to the fabric of all other arteries, which are largest at their exit from the trunk, these are smallest at their origin, and grow bigger in their progress towards the testes; by this means the blood receives a check at its first going off for those parts, which disposes it for the future changes, &c. it is to pass thro'. The same end is answered in quadrupeds, by having these arteries curled and contorted in their passage, like a screw. The reason why nature has taken another method in man, Mr. Cowper observes, is, that in this case the abdominal muscles must have been larger than they are; by which means the intestines would have been frequently let down into the scrotum; an inconvenience which quadrupeds are secured from, by the horizontal position of their bodies. The spermatic arteries, in their progress, meeting with the spermatic veins, enter together with them the inner lamella of the peritonæum; where insinuating into the duplicature of the process, and being cloathed therewith, they pass on to within three or four fingers breadth of the testicles, where they divide into two unequal branches, the biggest of which goes to the testicle, and is distributed therein; and the lesser in the parastata or epididymis. See the articles Artery, Testicle, and Parastatæ.

The spermatic veins take the same course with the arteries, only a little above the testicles they split into several branches, which uniting, form a plexus, called the corpus pampiniforme, or pyramidale. The blood returned by the spermatic veins, is delivered on the right side to the cava, and on the left into the emulgent vein. Their nerves arise from the plexes of the pelvis and of the loins. See Vein, Nerves, Corpus, &c.

SPERMATOCELE, in medicine and surgery, the same with the cirsocele, or hernia varicosa. See Cirsocele.

SPERMATOPOEA, the name given to such medicines as are supposed to increase the semen.

SPEY, a river of Scotland, which, running north east, through Badenoch and Murray, falls into the German sea, east of the firth of Murray.

SPEZIA, a town of Italy, in the territory of Genoa, situated on a bay of the Tuscan sea, fifty miles south east of Genoa.

SPHACELUS, in surgery and medicine, an absolute and perfect corruption or death of the parts; whereby it is distinguished from a gangrene, which is that very great and dangerous degree of inflammation, wherein the parts affected begin to corrupt and put on a state of putrefaction. See Gangrene.

In cases of a perfect sphacelus, or mortification, wherein the parts are become absolutely dead, and wholly without sense, and soft so as to retain the impressions of one's finger-end, and are plainly fetid and corrupted, all the medicines in the world will be insufficient to restore the parts to life again; and all that remains to be done, is the one miserable remedy for preserving the rest of the body, by cutting off that part, to prevent the mortification from spreading farther. A different method, however, is to be taken in this operation, according to the degree of the symptoms and the parts affected. If only some extremity of the foot, tarsus, metatarsus, ancle, or instep, or only the bare skin, and fat are sphacelated, the whole foot, in that case, ought not to be amputated, but preserving the limb entire, the surgeon is only to remove that part which is vitiated: and Heister's opinion is, that this is frequently best of all done by suppuration; or else by caustic medicines. When it is to be done by suppuration that is to be brought on as fast as possible; and when it is done, the crust or eschar, of the ulcer is to be suppurated from the sound parts with proper caution. To hasten effectually a suppuration in these cases, nothing is so serviceable as the making numerous long and deep scarifications near the sound parts; and afterwards the incised parts are to be well anointed with the common digestive ointment, and after that treated with the balsamic cataplasms and fomen-

mentations, in common ufe on the like occafions. A fomentation alfo ferviceable in thefe cafes, is made by mixing, in a quart of a decoction of fcordium, or of barley-water, vinegar of rue, fix ounces; fpirit of wine with venice-treacle, four ounces; and an ounce or two ounces of common falt; this is to be applied hot, with compreffes, to the incifed part, and frequently repeated till the diforder appears to fpread no farther, which is known to be the cafe, when the tumour of the vitiated part fubfides, and the edges of the found part become tumid all round; and the fecond or third day after this, a fuppuration is ufually formed, and the found parts become gradually feparated from the vitiated. After this, to foften and promote a fpeedy feparation of the efchar, the following cataplafm is always found highly ferviceable: take of fcordium, two handfuls; mallows, marfh-mallows, and henbane, of each one handful; lavender-flowers half a handful: let thefe be boiled to the confiftence of a cataplafm in vinegar or oxycrate; and when in that ftate, add to them three ounces of the flour of linfeed, one ounce of linfeed-oil, and two ounces of fal armoniac. This is to be applied warm over the whole, and is to be retained in that condition, as long as fhall be found neceffary, by means of a brick boiled in water, and applied wrapped in a linen-cloth, or fome other like means. See the articles SUPPURATION and FOMENTATION.

After thefe medicines have been ufed, and the whole furrounding fkin is gently tumefied with rednefs, a cruft or efchar is then formed by degrees, and the found flefh begins to feparate from the reft; by this we know that the diforder has done fpreading, and that an entire fuppuration of the vitiated parts will very fhortly follow. When this feparation fhews itfelf beginning, it fhould be promoted as much as poffible, by dreffing the part with the common digeftive, either alone, or mixed with venice-treacle, which muft be retained on between the found and the dead parts. To make way for this, it is fometimes neceffary to divide them a little by the lancet; and when that is done, and the dreffing has been applied, the before-defcribed cataplafm fhould be laid on warm; and in all the fucceeding dreffings, whatever is found loofe of the dead part muft be carefully removed. And if it be neceffary, from the adhefion of the vitiated parts to the found, to ufe the fciffars, or fcalpel, to divide them, this is always to be done with very little either of pain or danger; it will then be proper, to drefs the part with the digeftive, and a plafter of diachylon, or the like, over it, till the corrupted parts are entirely caft off, and the ulcer appears perfectly well cleanfed, and the cure is then eafily perfected in the common way.

This is the gentler and moft common method: fome furgeons, however, from the tedioufnefs of it, have recourfe directly, in thefe cafes, to the cauftic. They anoint either the edges only, or elfe the whole of the corrupted part, every day with butter of antimony, or the cauftic-ftone liquified, till the living parts are furrounded by a fort of efchar, applying afterwards the cataplafms before defcribed, or others of the fame kind, to prevent the diforder from fpreading, and to make the corrupted parts feparate from the found: the corrofive lixivium of Boerhaave is greatly in repute, and much ufed on thofe occafions; it is made of three ounces of very ftrong quick-lime, mixed with nine ounces of pot-afhes, firft ground feparately to powder, and afterwards mixed, adding a little water; they are then to be put into a glafs-veffel, and fet in a cellar, to run by deliquium. As foon as they are found to become fluid, the matter muft be put into a filtre of coarfe paper, and the clear liquor that runs through, muft be kept for ufe. It is to be ufed by dipping a brufh, or feather into it, or rubbing it over the part affected, once or twice a day; or fine linen-rags may be wetted with it, and applied all over the part, not forgetting, however, at the fame time, the ufe of the fore-mentioned cataplafm: this application is to be continued till the corrupted matter begins to caft off in crufts or fcales; and when this is the cafe, it muft be dreffed with the common digeftive; and, when perfectly cleanfed, healed with a vulnerary balfam.

Another cauftic highly commended by Bellofte in thefe cafes, is made by diffolving one part of crude mercury, in two parts either of fpirit of nitre, or of aquafortis: this is to be rubbed over the parts as the former, and will occafion a fpeedy feparation.

Finally, when the fphacelus is fo deeply affixed in any part of the upper or lower extremity, that it has penetrated through the mufcles fo far as the bone, and has either refifted the force of all medicines, or the

the proper time for applying them has been neglected, in this case, to preserve the rest of the body, the injured part must be amputated. See AMPUTATION.

SPHÆRANTHUS, in botany, a genus of the syngenesia-polygamia-necessaria class of plants, the general corolla whereof consists of hermaphrodite corollulæ in the center, and the female ones in the verge of the flower; the proper hermaphrodite one is monopetalous, funnel-shaped, and open, and quinquifid at the limb; there is scarce any female corolla; there is no pericarpium; the receptacle is naked; the seed is single, oblong, and naked.

SPHÆROCARPUS, in botany, a genus of the cryptogamia class of plants, consisting of foliaceous matter, expanded on the ground and producing very large and obvious fructifications. Dr. Hill thinks it probable, that the male flowers are produced on separate plants from the female, and have not been discovered to belong to the same species: no male parts of fructification are described to us; the female parts consist of a tubulated and inflated vagina, within which are contained a large globular capsule, containing a great number of small, loose seeds.

SPHÆROMACHIA, σφαιρομαχια, in antiquity, a particular kind of boxing, wherein the combatants had balls of stone, or lead, in their hands, which were called σφαιραι; hence the seventh part of the gymnasium, where this exercise was practised, was called the sphæristerium.

SPHAGNUM, in botany, a genus of the cryptogamia-muscorum class of plants, consisting of stalks furnished with leaves, and of capsules, in some respects resembling those of the bryum, but without any calyptræ, and standing on so short pedicles, that they do not appear to have any. Dr. Hill says, that the pedicles which support the capsules, grow in many of the species from the summits of the stalk; but Linnæus supposes it to be so in all, and makes it a part of the generical character.

SPHENOIDAL SUTURE, in anatomy, a suture thus called from its encompassing the os sphenoides, which it separates from the os frontis, the os petrosum, and the os occipitis. See SKULL, and the next article.

SPHENOIDES, or OS CRUCIFORME, in anatomy, the seventh bone of the cranium, or skull. See SKULL.

This bone is fixed in manner of a wedge among the other bones of the cranium, and serves as a basis, as it were, to support several of them, and some of those of the upper jaw: the figure of this bone is very irregular; in its upper part is seen the sella equina, or turcica, under which there is a sinus; this is sometimes double, and opens into the nostrils; sometimes it is totally wanting: it is called the sphenoidal sinus. The sphenoides has thirteen apophyses; six of them are internal, and are placed near the sella equina; and the other seven are external; four of these are of a pterygoide form, and thence named pterygoide apophyses; two of the other three are very small and styloide, and the seventh is placed under the vomer: there are also three fossæ, or cavities, in this bone, one in the sella equina, and the other between the pterygoide apophyses.

SPHENOPHARYNGÆUS, in anatomy, a pair of muscles, called also the pterygopharingæus. See PTERYGOIDÆUS.

SPHENOSTAPHYLINUS, in anatomy, a muscle of the larynx. It descends from a round fleshy origination, near the root of a process of the os sphenoides, and from thence runs obliquely to the uvula, and is inserted into its hinder and upper part, where it joins its partner. It serves to draw the uvula upwards and backwards, and hinders the masticated aliment from passing into the foramina narium, in deglutition.

SPHERE, *sphæra*, σφαιρα, is a solid contained under one uniform round surface, such as would be formed by the revolution of a circle about a diameter thereof, as an axis. Thus the circle A E B D (plate CCLVIII. fig. 3. n° 1.) revolving about the diameter A B, will generate a sphere, whose surface will be formed by the circumference of the circle.

Definitions. 1. The center and axis of a sphere, are the same as the center and diameter of the generating circle: and as a circle has an indefinite number of diameters, so a sphere may be considered as having also an indefinite number of diameters, round any one of which the sphere may be conceived to be generated. 2. Circles of the sphere are those circles described on its surface, by the motions of the extremities of the chords E D, F G, I H, &c. at right angles to A B; the diameters of which circles are equal to those chords. 3. The poles of a circle on the sphere, are those points on its surface, equally distant from the circumference of that circle: thus A and B are



the

the poles of the circles defcribed on the fphere by the ends of the chords ED, FG, IH, *&c.* 4. A great circle of the fphere is one equally diftant from both its poles; as that defcribed by the extremities of the diameter ED, which is equally diftant from both its poles A and B. 5. Leffer circles of the fphere are thofe which are unequally diftant from both their poles; as thofe defcribed by the extremities of the chords FG, HI, *&c.* becaufe unequally diftant from their poles A and B. See the article CIRCLE.

Axioms. 1. The diameter of every great circle paffes through the center of the fphere; but the diameters of all leffer circles do not pafs through the fame center: hence alfo the center of the fphere is the common center of all the great circles. 2. Every fection of a fphere by a plane, is a circle. 3. A fphere is divided into two equal parts, or hemifpheres, by the plane of every great circle; and into two unequal parts, called fegments, by the plane of every leffer circle. 4. The pole of every great circle is 90° diftant from it on the furface of the fphere; and no two great circles can have a common pole. 5. The poles of a great circle are the two extremities of that diameter of the fphere, which is perpendicular to the plane of that circle. 6. A plane paffing through three points on the furface of the fphere, equally diftant from any of the poles of a great circle will be parallel to the plane of that great circle. 7. The fhorteft diftance between two points, on the furface of a fphere, is the arch of a great circle paffing through thefe points. 8. If one great circle meets another, the angles on either fide are fupplements to each other; and every fpherical angle is lefs than 180°. 9. If two circles interfect each other, the oppofite angles are equal. 10. All circles on the fphere, having the fame pole, are cut into fimilar arches, by great circles paffing through that pole.

*Properties of the* SPHERE. 1. All fpheres are to one another as the cubes of their diameters. 2. The furface of a fphere is equal to four times the area of one of its great circles, as is demonftrated by Archimedes in his book Of the Sphere and Cylinder, lib. i. prop. 37. hence, to find the fuperficies of any fphere, we have this eafy rule; let the area of a great circle be multiplied by 4, and the product will be the fuperficies: or, according to Euclid, lib. vi. prop. 20. and lib. xii. prop. 2. the area of a given fphere, CEBD (*ibid.* n° 2.) is equal to that of a circle, whofe radius is equal to the diameter of the fphere BC. Therefore, having meafured the circle defcribed with the radius BC, this will give the furface of the fphere. 3. The folidity of a fphere is equal to the furface multiplied into one third of the radius: or, a fphere is equal to two thirds of its circumfcribing cylinder, having its bafe equal to a great circle of the fphere. Let ABEC (*ibid.* n° 3. and 4.) be the quadrant of a circle, and ABDC the circumfcribed fquare, equal twice the triangle ADC: by the revolution of the figure about the right line AC, as an axis, a hemifphere will be generated by the quadrant, a cylinder of the fame bafe and height of the fquare, and a cone by the triangle: let thefe three be cut any how by the plane HF, parallel to the bafe AB; and the fection of the cylinder will be a circle, whofe radius is FH; in the hemifphere, a circle whofe radius is FE; and in the cone, a circle of the radius FG. But $EA^2$ ($= HF^2$) $= EF^2 + FA^2$: but $AF^2 = FG^2$, becaufe $AC = CD$; and therefore $HF^2 = EF^2 + FG^2$; or the circle of the radius HF, is equal to a circle of the radius EF, together with a circle of the radius GF: and fince this is true every where, all the circles together defcribed by the refpective radii HF, that is the cylinder, are equal to all the circles defcribed by the refpective radii EF and FG, that is, to the hemifphere and cone taken together. But by Euclid, lib. xii. prop. 10. the cone generated by the triangle DAC, is one third part of the cylinder, generated by the fquare BC, whence it follows, that the hemifphere generated by the rotation of the quadrant ABEC, is equal to the remaining two thirds of the cylinder, and that the whole fphere is two thirds of the cylinder circumfcribed about it. Hence it follows, that a fphere is equal to a cone whofe height is equal to the femi-diameter of the fphere, and its bafe equal to the fuperficies of the fphere, or to the area of four great circles of the fphere, or to that of a circle, whofe radius is equal to the diameter of the fphere. See CONE, CIRCLE, CYLINDER, *&c.*

*Circles of the* SPHERE. See CIRCLE.

*Projection of the* SPHERE. See PROJECTION.

*Sector or fegment of a* SPHERE. See the articles SECTOR and SEGMENT.

SPHERE, in aftronomy, that concave orb, or

or expanſe, which inveſts our globe, and in which the heavenly bodies appear to be fixed, and at an equal diſtance from the eye.

The better to determine the places of the heavenly bodies in the ſphere, ſeveral circles are ſuppoſed to be deſcribed on the ſurface thereof, hence called the circles of the ſphere: of theſe, ſome are called great circles, as the equinoctial, ecliptic, meridian, *&c.* and others, ſmall circles, as the tropics, parallels, *&c.* See each under its proper article.

*Armillary* SPHERE. See the article ARMILLARY SPHERE.

SPHERE *of activity of a body*, is that determinate ſpace or extent to which, and no farther, the effluvia continually emitted from that body, reach; and where they operate, according to their nature. See the article POWER.

SPHERICAL ANGLE, TRIANGLE, and TRIGONOMETRY. See ANGLE, TRIANGLE, and TRIGONOMETRY.

SPHERICS, is that part of geometry which treats of the poſition and menſuration of arches of circles, deſcribed on the ſurface of a ſphere. See the article SPHERE.

SPHEROID, in geometry, a ſolid, approaching to the figure of a ſphere.

The ſpheroid is generated by the entire revolution of a ſemi-ellipſis about its axis. See the article ELLIPSIS.

Thus, if the ſemi-ellipſis AHFB (plate CCLIX. fig. 1. n° 1.) be ſuppoſed to revolve round its tranſverſe axis AB, it will generate the oblong ſpheroid AHFBC. Now as all circles are as the ſquares deſcribed upon their radii; that is, the circle of the radius EH, is to the circle of the radius EG, as $CF^2$ to $CD^2$, becauſe EH : EG : : CF : CD; and ſince it is ſo every where, all the circles deſcribed with the reſpective radii EH, (that is, the ſpheroid made by the rotation of the ſemi-ellipſis AFB about the axis AB) will be to all the circles deſcribed by the reſpective radii EG, (that is, the ſphere deſcribed by the rotation of the ſemi-circle ADB on the axis AB) as $FC^2$ to $CD^2$; that is, as the ſpheroid is to the ſphere on the ſame axis, ſo is the other axis of the generating ellipſis to the ſquare of the diameter or axis of the ſphere: and this holds whether the ſpheroid be formed by a revolution around the greater or leſſer axis.

Hence it appears, that the half of the ſpheroid, formed by the rotation of the ſpace AHFC, around the axis AC, is double of the cone generated by the triangle AFC, about the ſame axis. Hence, alſo, is evident the meaſure of the ſegments of the ſpheroid, cut by planes perpendicular to the axis: for the ſegment of the ſpheroid, made by the rotation of the ſpace ANHE round the axis AE, is to the ſegment of the ſphere, having the ſame axis AC, and made by the rotation of the ſegment of the circle AMGE, as $CF^2$ to $CD^2$. But the meaſure of this ſolid may be found with leſs trouble by this analogy; *viz.* as BE : AC + EB : : ſo is the cone generated by the rotation of the triangle AHE round the axis AE: to the ſegment of the ſphere made by the rotation of the ſpace ANHE round the ſame axis AE, as is demonſtrated by Archimedes of conoids and ſpheroids, prop. 34. This agrees as well to the oblate as to the oblong ſpheroid. See the articles SPHERE and SEGMENT.

A ſpheroid is alſo equal to two thirds of its circumſcribing cylinder. See the articles CYLINDER and FRUSTUM.

As to the ſuperficies of a ſpheroid, Mr. Huygens gives the two following conſtructions in his Horolog. Oſcill. For deſcribing a circle equal to the ſuperficies of an oblong and prolate ſpheroid: 1. Let an oblong ſpheroid be generated by the rotation of the ellipſis ADBE, (*ib.* n° 2.) about its tranſverſe axis AB, and let DE be its conjugate; make DF equal to CB, or let F be one of the foci, and draw BG parallel to FD, and about the point G, with the radius BG, deſcribe an arch, BHA, of a circle; then between the ſemi-conjugate CD, and a right line equal to DE + the arch AHB, find a mean proportional, and that will be the radius of a circle equal to the ſuperficies of the oblong ſpheroid. 2. Let a prolate ſpheroid be generated by the rotation of the ellipſis ADBE (*ibid.* n° 3.) about its conjugate axis AB. Let F be one of the foci, and biſſect CF in G, and let AGB be the curve of the common parabola whoſe baſe is the conjugate diameter AB, and axis CG. Then if between the tranſverſe axis DE, and a right line equal to the curve AGB of the parabola, a mean proportional be taken, the ſame will be the radius of a circle equal to the ſurface of that prolate ſpheroid.

For the ſpheroidical figure of the earth, and the difference this muſt occaſion in the

the meridional parts, ufed in the projection of Mercator's chart, fee the articles EARTH and MERIDIONAL.

SPHINCTER, in anatomy, a term applied to a kind of circular mufcles, or mufcles in form of rings, which ferve to clofe and draw up feveral orifices of the body, and prevent the excretion of the contents: thus the fphincter of the anus clofes the extremity of the inteftinum rectum. It has its origin from the bottom of the os coccygis, and the fkin that is under this bone; and its fibres, from hence feparating every way from one another, and furrounding the anus in every part, afcend afterwards in men into the lower part of the bulb of the urethra, or into the acceleratores mufcles which furround this bulb, and are there terminated. In women, they are inferted into the lower part of the vagina of the uterus. Many fibres alfo defcend from the interior and lower part of the os pubis, near the fynchondrofis; and forming a body of an oval figure, and of the breadth of a man's thumb, they furround the extremity of the rectum; and when they act, have the fame effect of drawing it together and clofing it: there are indeed but few merely circular, or annular fibres, fuch as are ufually faid to compofe the fphincter, obferved in diffection. See the article ANUS.

The fphincter of the bladder is compofed of a feries of tranfverfe fibres running crofswife, under the ftrait fibres of the neck of the bladder, in form of a circle, and ferving to clofe it, to prevent the involuntary difcharge of the urine. In men this is connected to the fibres of the inteftinum rectum, and in women to thofe of the vagina. See BLADDER.

The fphincter gulæ, or, as it is otherwife called, the oefophagæus, is a fingle mufcle, which ferves for the conftriction of the pharynx. This rifes on each fide of the os hyoides, and the thyroide, and the cricoide of the larynx, which furrounds the hinder part of the gulæ. See the article PHARYNX.

The fphincter of the pupil of the eye appears upon the pofterior furface of the uvea when its blacknefs is cleared away, and is formed of circular fibres for contraction, as the ciliary fibres are for the dilatation of the pupil. See EYE.

The fphincter of the vagina is compofed of a feries of mufcular fibres arifing from the fphincter of the anus, and furrounds the orifice of the vagina; after which it is inferted under the crura of the clitoris. For the fphincter of the lips, fee the article CONSTRICTOR.

SPHINX, σφιγξ, in fculpture, *&c.* a figure or reprefentation of a monfter of that name, famed among the antients, now moftly ufed as an ornament in gardens, terraces, *&c.* It is reprefented with the head and breafts of a woman, the wings of a bird, the claws of a lion, and the reft of the body like a dog. It is fuppofed to have been engendered by Typhon, and fent by Juno to be revenged on the Thebans. Its office, they fay, was to propofe dark enigmatical queftions to all paffers by; and if they did not give the explication thereof, to devour them. It made horrible ravages, as the ftory goes, on a mountain near Thebes, and could not by any means be deftroyed, till after OEdipus had folved the following riddle, "What animal is it that in the morning walks on four legs, at noon on two, and at night on three?" The anfwer was "Man."

Among the Egyptians, the fphinx was the fymbol of religion, by reafon of the obfcurity of its myfteries: and on the fame account the Romans placed a fphinx in the porch of their temples.

SPICA VIRGINIS, a ftar of the firft magnitude, in the conftellation virgo. Its place is in the more foutherly hand. Its longitude, according to Mr. Flamfteed, is 19° 31′ 22″: its lat. 2° 1′ 59″ fouth.

SPICE, any kind of aromatic drug that has hot and pungent qualities: fuch are pepper, nutmeg, ginger, cinnamon, cloves, *&c.* See the articles AROMATIC, PEPPER, *&c.*

Some alfo apply the word to divers other medicinal drugs brought from the eaft: as fena, caffia, frankincenfe, *&c.* See the article SENA, *&c.*

SPICE-ISLANDS, fituated in the Eaft-Indies. See the articles BANDA, MOLUCCA-ISLANDS, and CEYLON.

SPIDER, *aranea*, in zoology, an infect of a roundifh or elliptic figure, having eight eyes placed on the hinder part of the thorax, and having alfo eight legs. This creature has a power of fpinning. See the article WEB.

The fpecies of fpiders are very numerous; but authors have made them more fo, by admitting among them other infects of a very different genera.

SPIDER-WORT, in botany. See the article PHALANGIUM.

SPIEL, in the glafs-trade, an iron inftrument,

ment, hooked at the end and pointed, with which the workmen take the metal up out of the melting-pots, for proofs or eſſays, to ſee whether it be fit for work.

SPIGELBURG, a town of Germany, in the circle of Weſtphalia, capital of the county of Spigelburg: eaſt long. 9° 25′, north lat. 52° 6′.

SPIGELIA, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle petal, of the ſhape of a funnel: the tube is much longer than the cup, and is narrower below than above: the pericarpium conſiſts of two globoſe fruits, growing together, and ſituated on the cup: the ſeeds are roundiſh very ſmall, and numerous.

SPIGNEL, in botany, the engliſh name of the plant athamanta. See the article Athamanta.

SPIGNO, a town of Italy, in the dutchy of Monferrat: ſituated ſixty miles ſouth-eaſt of Turin.

SPIKE, or *oil of* Spike, a name given to an eſſential oil diſtilled from lavender, and much uſed by the varniſh-makers and the painters in enamel, and of ſome uſe in medicine. It is brought from Provence, and other parts of France, where the lavender is called aſpic, and thence came the name of oil of ſpike. This oil, when in perfection, is very limpid; of a pleaſant yellowiſh colour; very fragrant; poſſeſſing, in an eminent degree, the peculiar ſmell generally admired in the flowers. In medicine it is uſed, both externally and internally, in paralytic and lethargic complaints, rheumatic pains, and debilities of the nervous ſyſtem. The doſe is from one drop to five or ſix; but our artificers, in their varniſhes, uſe more of this oil than the apothecaries do: and wanting it at a cheap rate, they have taught the druggiſts, who uſed to import and ſell it to them, ſo many ways of adulterating it, that at preſent it is ſcarce any where to be met with genuine; and ſo coarſe an ingredient as common oil of turpentine is uſed as the baſis of all the counterfeits: they alſo ſometimes adulterate it with ſpirit of wine. But both theſe cheats are eaſily diſcovered: that mixed with ſpirit of wine may be known by only mixing the whole with water, in which caſe the water, uniting with the ſpirit, leaves the oil at the top alone: that mixed with oil of turpentine, is diſcovered by burning a ſpoonful of it; for the genuine oil of ſpike burns with a clear flame and without ſmoke, and its ſmell, while burning, is very fragrant; whereas, when there is oil of turpentine mixed, it burns more furiouſly, emits a thick ſmoke, and is of a very bad ſmell. This oil is diſtilled from the ſmaller ſpecies of lavender, in the common way, by the alembic. See Lavandula.

SPIKENARD, *nardus*, in botany. See the article Nardus.

*Ploughman's* Spikenard, in botany, the ſame with the conyza, or flea-bane. See the article Conyza.

SPIKING *up the ordonance*, a ſea-phraſe, uſed for faſtening a quoin with ſpikes to the deck cloſe to the breech of the carriages of great guns, that they may keep cloſe and firm to the ſhip's ſides, and not get looſe when the ſhip rolls, and by that means endanger the breaking out of a butt head of a plank. See Quoin.

SPILIMBERGO, a town of Italy, in the territory of Venice, and province of Friuli, ſituated forty-five miles north of Venice.

SPILSBY, a market-town of Lincolnſhire; ſituated twenty-ſeven miles eaſt of Lincoln.

SPINA bifida, in anatomy, a parting of the ſpinal proceſſes into two rows: the exiſtence of ſuch a caſe is doubted. See the article Spine.

Spina ventosa, in ſurgery and medicine, that ſpecies of corruption of the bones which takes its riſe in the internal parts, and by degrees enlarges the bone, and raiſes it into a tumour, and which, when it happens to children, is termed by Severinus, and many others, pædarthrocaces. See the articles Pædarthrocaces and Tumour.

In the ſpina ventoſa, the caries or eroſion of the bone, is, according to Heiſter, occaſioned by a depravity of the contained fluids, and generally ariſes ſpontaneouſly, or without any external cauſes: nor does it begin upon the ſurface of the bone, but between its lamellæ, or elſe in its internal cavity; from thence it extends, by degrees, to the external parts; and at length either affects the whole bone or a greater or ſmaller part of it; expanding itſelf to different widths, and riſing to a tumour which is ſometimes hard and without pain, and at other times feels as if it were filled with wind: it is attended with a greater or leſſer degree of pain, pricking and ſhooting; at laſt it grows red, and is accompanied with other bad ſymptoms till the

the difordered bone, being by degrees corroded, the common integuments, and other fofter parts that lay over it, remaining at firft intire, partake of the diforder; then foul ulcers of a very terrible fort break out. When tumours of the bone are hard, and the foft parts about them are not inflated, but free from rednefs, inflammation, and pain, as is very frequently the cafe in ricketty diforders, the bad fymptoms juft defcribed feldom come on: this is properly the pædarthroaces: but the painful, red, inflated tumours, happening equally to children and to adults, are the fpina ventofa. It differs from a caries, by being attended with tumour; and from an exoftofis, as this latter is an excrefcence of the bone, whether attended with erofion or not. See the articles CARIES, RICKETS, EXOSTOSIS, &c.

The fpina ventofa generally begins about the heads or epiphyfes of the larger bones, where they are moft tender and fpongy, and where the noxious matter may not only have fufficient room to lodge in the cellular fubftance, but where it will alfo meet with the leaft refiftance in foftening and expanding the parts. The os frontis is fubject to diforders of this kind in venereal cafes; and it is frequently fituated in the bones of the neck, face, and breaft.

Though this diforder ufually arifes from internal, yet it is fometimes found to be owing to external caufes, efpecially in perfons conftitutionally addicted to a diforder of this kind; when the veffels between the lamellæ of the bone, or in the medulla itfelf, are by a blow, fall, or other external violence, injured or torn. But the proximate caufe of this diforder is either a collection, or congeftion, of a vifcid and thick, or of an acrimonious and corroding humour; or an inflammation arifing in the medulla, or in the fubftance or cells of the bone degenerating into an abfcefs, and forming an ichor or pus. The collection of vifcid and pituitous matter, and the expanfion of the bones, fometimes happens without pain; but the erofion of the parts can never happen without the moft acute pains. When the internal parts of the bones only are affected by this diforder, the pain does not increafe upon external preffure. When the pain encreafes upon external preffure, the external parts are brought into confent; and when this happens, the periofteum, and parts which furround it, with the fubftance of the bone, and tunica cellularis, enlarge; from whence a fenfation frequently arifes as if the parts were filled with air or wind.

A fpina ventofa, ftrictly fo called, is by Heifter divided into three degrees: the firft is, when the patient complains of a grievous pain in the bone, which feems to him to proceed from the medulla. At this time there is no external pain nor tumour. In this ftate the difeafe is confined to the internal part of the bone. The fecond degree of the difeafe is, when after the pains a tumour appears upon the face of the bone, either hard or foft, and as it were windy, with external pain more or lefs. The third degree is, when after all the fymptoms, an abfcefs is formed in the tumour, which either burfts fpontaneoufly or is opened with the knife, and difcharges a fetid ichor, or purulent matter, fmelling like rank butter or lard.

There are two methods of treating this diforder: one fuited to the two milder degrees of it, and the other to the more violent ftate of it. In the milder ftages, Heifter directs that the acrimony of the blood be corrected by large draughts of the decoctions of the woods with the china and farfaparilla roots: that the parts affected be fumigated with the fteam of decoctions of aromatic herbs; and twice a day, in the intermediate times, that the part be rubbed over with mercurial ointment, and afterwards covered with the common mercurial plafter. Mercurial medicines muft alfo be given internally, according to the ftrength of the patient; and fometimes a falivation is neceffary. By diligently purfuing this method for fome weeks, the firft and fecond ftages of this diforder may be cured, even where there are bony tumours formed; and the tumours may either be reduced, or at leaft brought to that ftate, that they will remain as they are without farther increafe or without pain, or any farther inconveniency. But when thefe tumours are fo far advanced as to be out of the reach of remedies, the pains and tumours increafing, and abfceffes forming, there is great reafon to fear the entire deftruction of the bone. If the abfcefs does not burft of itfelf, the furgeon muft not wait for its maturation, but lay the bone bare, in the loweft or moft painful part. When the abfcefs is already burft, if the

opening

opening is too ſmall it muſt be enlarged, either with the knife or a cauſtic; and after this ſeveral holes muſt be made in the bone with a ſmall piercer, perforating it into the medulla, to give way for the diſcharge of the confined matter; and when theſe ſmall holes are not ſufficient, a larger muſt be made by the trepan, if the bone will admit it.

Whilſt this is under cure, the patient muſt uſe, internally, the decoction of the woods, and mild mercurial and antimonial medicines; and externally, the wound muſt be treated with cleanſing and balſamic remedies, ſuch as decoctions of agrimony, ſanicle, St. John's-wort, or birthwort, and eſſence of myrrh and aloes, which muſt be injected with a ſyringe twice every day, as may alſo a ſolution of mercurius dulcis, made in plantane-water or lime-water. Honey of roſes ſhould be added, in a ſmall quantity, to either of the decoctions uſed as eſſences; and after the uſe of them the wound ſhould be dreſſed with the forementioned eſſences, or with thoſe of maſtich, or amber, ſpread upon lint, and covered with a mercurial or other plaſter. This method is to be continued till the parts are healed. The actual cautery is ſometimes neceſſary to root out the diſorder, eſpecially when it is only between the lamellæ of the bone. See CAUTERY.

But when all theſe methods are unſucceſsful, and the part is already too much corroded and deſtroyed, there is no hope of ſaving it, nor indeed the life of the patient, by any other means than cutting off the limb. When the diſorder is ſituated, however, in ſome ſmall bone, as on the carpus, tarſus, metacarpus, or metatarſus, or fingers, it will not be neceſſary to take off the whole limb, as it will frequently ſuffice to remove the corrupt bone alone. In larger bones, where the whole bone is not affected, but only a part of its external ſurface is diſordered, by either a caries or a ſpina ventoſa, the whole limb is by no means to be taken off, but the diſeaſed part of the bone only removed: but when a large bone, as the os humeri, tibia, or femur, or an intire joint of the arm, knee, or foot, is diſeaſed, there is no remedy but amputating it in the ſound parts juſt above.

SPINACHIA, or SPINACIA, SPINACH, or SPINAGE, in botany, a genus of the dioecia-pentandria claſs of plants: the calyx of the male flower is divided into five parts, having no corolla; the calyx of the female flower is divided into four parts, having no corolla neither: the ſtyles are four: the ſeed is ſingle, roundiſh, and incloſed within the cup, which becomes indurated.

This plant is well enough known in food, but has nothing to do in medicine, except in counterfeiting the colours of ſome things of value, as particularly giving to Gaſcoign's powder the ſame colour as is given by bezoar: however, the leaves of ſpinach are, by ſome writers, claſſed among the coolers.

SPINAL MARROW. See the article MEDULLA SPINALIS.

SPINALIS, in anatomy, the names of ſeveral muſcles, *&c.* of the ſpine, but more particularly that of a muſcle on the ſide of the neck, ariſing from the five ſuperior proceſſes of the vertebræ of the thorax, and the inferior of the neck; and which in its aſcent, becoming more fleſhy, is inſerted into the inferior part of the vertebræ of the neck laterally. It ſerves to draw the neck backwards.

Other muſcles of the back, neck, *&c.* called by ſome anatomiſts ſpinalis, are, 1. the ſpinalis cervicis, called by others tranſverſalis: 2. ſpinalis colli minores, are muſcles lying between the ſix ſpinal apophyſes of the neck, and between the laſt of the neck and the firſt of the back, called by ſome interſpinales. Other muſcles of this name are, 3. the ſpinalis dorſi, being called by ſome, a part of the ſemi-ſpinatus; and by others a part of the longiſſimus dorſi. 4. The ſpinalis dorſi major, is a pretty long and ſlender muſcle, lying upon the lateral parts of the extremities of the ſpinal apophyſes of the back, called, by ſome, ſemi-ſpinalis. 5. Spinales dorſi minores are muſcles of two kinds, ſome going laterally from the extremity of one ſpinal apophyſes to another, being often mixed with the ſhort faſciculi of the ſpinalis major; the reſt lie directly between the extremities of two neighbouring ſpinal apophyſes; being ſeparated from thoſe on the other ſide by the ſpinal ligament: theſe are ſometimes termed interſpinales. 6. Spinales, and tranſverſales lumborum, are ſome faſciculi which run up from the ſuperior falſe ſpines of the os ſacrum, to the lower ſpinal apophyſes of the loins. See the articles MUSCLE, TRANSVERSALIS, *&c.*

For the ſpinal nerves, *&c.* ſee the article NERVES, *&c.*

 The

The ſpinal acceſſory nerve of Willis, is a ſort of ninth pair of nerves of the neck, ariſing from the ſpinal marrow, about the origin of the third or fourth pair, and paſſing through the great foramen of the os occipitis up into the cranium: it is then joined to the par vagum, and coming out of the cranium again by the ſame aperture, it recedes from the par vagum, and is bent back to the muſculus ſcapulæ cucullaris or trapezius.

SPINDLE, in the ſea-language, is the ſmalleſt part of the ſhips capſtan, which is betwixt the two decks. The ſpindle of the jeer-capſtan has whelps to heave the viol. See the article CAPSTAN.

The axis of the wheel of a watch or clock, is alſo called the ſpindle. Among miners, the ſpindle is a piece of wood faſtened into either ſtow blade.

SPINDLE SHELL, in ichthyology, the ſlender tuberculous buccinum, with an elongated roſtrum. See BUCCINUM.

SPINE, SPINA-DORSI, in anatomy, the bony column reaching from the head down to the anus; being the ſeries or aſſemblage of vertebræ which ſuſtain the reſt of the body, contain the ſpinal marrow, and to which the ribs are connected. See the articles VERTEBRÆ, MEDULLA SPINALIS, and RIBS.

The uſual diviſion of the ſpine is into the neck, the back, the loins, and the os ſacrum, and coccygis. See the articles NECK, DORSUM, &c.

*Luxations, fractures, and other injuries of the* SPINE. The ſigns common to luxations in the ſpine are chiefly the following: The back itſelf is found to be crooked after ſome external violence has been inflicted upon it; the patient can neither ſtand nor walk, and his whole body ſeems to be paralytic; the parts which are beneath the luxated vertebræ are nearly without all ſenſe and motion; the excrement and urine cannot be diſcharged, or elſe they are ſometimes emitted involuntarily; the lower extremities grow dead by degrees, and at length death itſelf follows: but theſe ſymptoms vary in proportion to the degree of violence in the luxation. Where there is but one vertebræ luxated, the curvature is gibbous, making a ſort of angle: if the proceſſes of the vertebræ are diſplaced forwards, then the ſpine will ſeem to bend inwards, and the pains will be more gentle, when the patient lies on his back: if the vertebræ is luxated on the right ſide, the body will incline towards the left, and *vice verſa*. Luxations of the ſpinal vertebræ are in general very difficult to reduce; but the following ſeems to be the beſt method of reducing them, according to Heiſter: When the apophyſes are diſlocated on both ſides, the patient is to be laid leaning upon his belly over a caſk, drum, or ſome other gibbous body, and then two aſſiſtants are ſtrongly to preſs down both ends of the ſpine on each ſide; then the ſurgeon is to preſs down the luxated vertebræ, and at the ſame time to puſh nimbly the ſuperior part of the body upwards, by which means, the luxated vertebræ are ſometimes commodiouſly reduced into their right places: but if ſucceſs ſhould not attend the firſt time, the method ſhould be repeated two or three times more. When the vertebræ comes out on one ſide, the patient is then to be placed as before, but ſo that when the left apophyſis is diſplaced, one aſſiſtant may preſs the lower vertebræ inwards to the right, and another aſſiſtant may depreſs the right humerus, and *vice verſa*. For the remainder, it ſeems proper, after the vertebræ are reduced, to bathe the ſpine with ſpirit of wine, or to lay on compreſſes dipped in ſpirit of wine camphorated, and to bind the parts up with the napkin and ſcapulary. See the article LUXATION.

When any of the vertebræ are fractured either by a fall, blow, or any other cauſe, without hurting the ſpinal marrow, it is to be ſuppoſed that the fracture is confined to ſome of the oblique or ſpinal proceſſes, and therefore the patient will be in no great danger; but when the body of the vertebræ is either broke or ſplit, and the contiguous ſpinal marrow bruiſed or compreſſed, all the parts of the limbs and viſcera beneath that vertebræ will become immoveable and rigid, and death will ſooner or later follow the accident: and if the tranſverſe proceſſes of the vertebræ are broke, which incline towards the cavity of the thorax, it is ſcarce poſſible that the heads of the ribs, which are there connected, ſhould eſcape being fractured. Theſe fractures are to be judged of from the nature of the external violence which occaſioned them, from the pains ſeated about the affected vertebræ, and from the touch, eye, &c. When only the proceſſes of the vertebræ are found broken, it will be much the beſt way to force them into their places with

with the fingers, placing narrow compreſſes dipt in warm ſpirit of wine on each ſide of the vertebræ, and over them ſlips of thick paſteboard, to be kept on by the napkin and ſcapulary. See the article FRACTURE.

When the ſpine is ſo injured that the ſpinal marrow is wounded, ſuch wounds as are ſlight may be dreſſed with peruvian balſam, eſſence of myrrh, or medicines of a like nature, mixed with a quantity of honey of roſes ſpread upon a pledget, and applied moderately warm; by which means, if the patient is of a good conſtitution, the parts ſometimes heal, but large wounds here bring certain death.

For the luxations, fractures, &c. of the other parts of the ſpine, ſee the articles NECK, LOINS, SACRUM OS, &c.

SPINES *of echini*, in natural hiſtory. Theſe in their foſſil ſtate make a great appearance in the cabinets of the curious, and in the works of the learned, and are of an almoſt infinite variety of kinds; and many of them are of the ſame figures and dimenſions with thoſe of the echini now living in our own and other ſeas, and well known to us. But beſide theſe there are an almoſt infinite variety of others, which though allowed on all hands to be truely ſpines of ſome echini or other, yet evidently differ from thoſe of all the known recent fiſh of that name, and have certainly belonged to ſpecies of it, which we have not yet the leaſt knowledge of. Theſe, however different in ſhape from one another, yet all agree in their texture and conſtituent matter, both with one another, and with the foſſil remains that ſupply the places of the ſhells of the other ſpecies ſo common in our chalk-pits, all being compoſed of a plated, or tabulated ſpar. Both theſe ſhells and the ſpines, though they retain every outer lineament of the bodies they owe their form to, yet have they nothing of their interior texture, nor any the leaſt reſemblance of it, but are compoſed of plates ſet edgewiſe, or aſlant, in the ſhells, and in the ſpines always obliquely to the axis of the body; ſo that all the foſſil ſpines of echini break regularly in an oblique direction, and always ſhew on each part a perfectly ſmooth, and gloſſy, ſlanting ſurface.

Of the foſſil ſpines of echini ſome are long and ſlender, tapering from a broader baſis to a fine point, and ſometimes from a thick part, at or near the middle, to an obtuſe point at each end: theſe are uſually ſtriated, ridged, or furrowed, and often elegantly granulated, though ſometimes they are ſmooth. Theſe moſt reſemble the ſpines of the more common ſpecies of recent or living echini we are acquainted with; others of them are of the ſame length with the common long ones, but are very flat, and are ridged more or leſs high, or covered with tubercles of different ſhapes; others are ragged, and variouſly jagged, and knotted like a rough branch of fir, ſtript of its leaves, or that ſort of fucus called the ſea-ragged-ſtaff. The ſpines themſelves are uſually bedded in the ſtrata of chalk, though ſometimes they are found in the ſtone-quarries, and ſometimes, but that moſt rarely, bedded in clay, or looſe among gravel.

SPINET or SPINNET, a muſical inſtrument ranked in the ſecond or third place among harmonious inſtruments. It conſiſts of a cheſt or belly made of the moſt porous and reſinous wood to be found, and a table of fir glued on ſlips of wood called ſummers, which bear on the ſides. On the table is raiſed two little prominences or bridges, wherein are placed ſo many pins as there are chords or ſtrings to the inſtrument. It is played on by two ranges of continued keys, the former range being the order of the diatonic ſcale, and that behind the order of the artificial notes or ſemi-tones. The keys are ſo many flat pieces of wood, which, touched and preſſed down at the end, make the other raiſe a jack which ſtrike and ſound the ſtrings by means of the end of a crow's quill wherewith it is armed. The thirty firſt ſtrings are of braſs, the other more delicate ones of ſteel or iron wire: they are all ſtretched over the two bridges already mentioned. The figure of the ſpinet is a long ſquare or parallelogram; ſome call it an harp-couched, and the harp an inverted ſpinet See the article HARP.

This inſtrument is generally tuned by the ear, which method of the practical muſicians is founded on a ſuppoſition, that the ear is a perfect judge of an octave and fifth. The general rule is to begin at a certain note, as C, taken towards the middle of the inſtrument, and tuning all the octaves up and down, and alſo the fifths, reckoning ſeven ſemi-tones to each fifth, by which means the whole is tuned. Sometimes to the common or fundamental

fundamental play of the fpinet is added another fimilar one in unifon, and a third in octave to the firft, to make the harmony the fuller; they are either played feparately or together by means of a ftop; thefe are called double or triple fpinets; fometimes a play of violins is added, by means of a bow, or a few wheels parallel to the keys, which prefs the ftrings and make the founds laft as long as the mufician pleafes, and heighten and foften them more or lefs, as they are more or lefs preffed. The harpfichord is a kind of fpinet, only with another difpofition of the keys. See the article HARPSICHORD.

SPINNING, in commerce, the act or art of reducing filk, flax, hemp, wool, hair, or other matters, into thread. Spinning is either performed on the wheel with a diftaff and fpindle, or with other machines proper for the feveral kinds of working. Hemp, flax, nettle-thread, and the like vegetable matters, are to be wetted in fpinning; filks, wools, &c. are to be fpun dry, and do not need water; but there is a way of fpinning filk as it comes off the cafes or balls, where hot and even boiling water is to be ufed.

SPINOSE LEAF, in botany, expreffes a leaf whofe difk or edge is armed with cartilaginous points, fo firmly affixed that they cannot be feparated without injuring the leaf itfelf.

SPINOUS FISHES, fuch as have fome of the rays of the back-fins running out into thorns or prickles, as the pearch, &c. See the article ICHTHYOLOGY.

SPINOZISM, or SPINOSISM, the doctrine of Spinoza, or atheifm and pantheifm propofed after the manner of Spinoza, who was born a Jew at Amfterdam.

The great principles of fpinozifm, is that there is nothing properly and abfolutely exifting befides matter and the modifications of matter; among which are even comprehended thought, abftract and general ideas, comparifons, relations, combinations of relations, &c.

The chief articles in Spinoza's fyftem are reducible to thefe. That there is but one fubftance in nature, and that this only fubftance is endued with an infinite number of attributes, among which are extenfion and cogitation: that all the bodies in the univerfe are modifications of this fubftance confidered as it is extended; and that all the fouls of men are modifications of the fame fubftance confidered as cogitative: that God is a neceffary and infinitely perfect being, and is the caufe of all things that exift, but not a different being from them: that there is but one being and one nature, and that this nature produces within itfelf, by an immanent act, all thofe which we call creatures; and that this being is at the fame time both agent and patient, efficient caufe and fubject, but that he produces nothing but modifications of himfelf.

Thus is the deity made the fole agent as well as patient in all evil, both phyfical and moral; a doctrine fraught with more impieties than all the heathen poets have publifhed concerning their Jupiter, Venus, Bacchus, &c. It is obferved, that what feems to have led Spinoza to this fyftem, was the difficulty of conceiving either that matter is eternal and different from God, or that it could be produced from nothing, or that an infinite and free being could have made a world fuch as this is. A matter that exifts neceffarily, and which neverthelefs is void of activity, and fubject to the power of another principle, is an object that ftartles our underftanding, as there feems no agreement between the three conditions. It is alfo held, that a matter created out of nothing, feems to be no lefs inconceivable, whatever efforts we make to form an idea of the act of the will that can change what before was thought nothing into real fubftance. Befides, its being contrary to that known maxim of philofophers, *ex nihilo nihil fit*. In fine, that an infinitely good, holy, free being, fhould rather choofe to have them wicked and eternally miferable, is no lefs incomprehenfible; and the rather as it feems difficult to reconcile the freedom of man with the quality of a being made out of nothing. Thefe, it is obferved, appear to have been the difficulties which led Spinoza to fearch for a new fyftem, wherein God fhould not be diftinct from matter, and wherein he fhould act neceffarily, and to the extent of all his power, not out of himfelf *(ad extra)* but within himfelf. But it is certain, that if this fyftem refcues us from fome difficulties, it involves us in others much greater. See the articles GOD, SOUL, NATURE, MATTER, EXISTENCE, SUBSTANCE, EXTENSION, GENERATION, CORRUPTION, ESSENCE, &c.

SPINSTER, in law, an addition ufually given to all unmarried women from the vifcount's daughter downwards; but according to Sir Edward Cooke, generofa is

is a good addition for a gentlewoman; and that if ſuch a perſon be named ſpinſter in any original writ, appeal, or indictment, ſhe may abate and quaſh the ſame.

SPIRÆA, in botany, a genus of the icoſandria-pentagynia claſs of plants, with a roſaceous flower, conſiſting of five roundiſh, plane petals: its fruit conſiſts of five oblong, compreſſed, acuminated capſules, each formed of two valves, and containing a few acuminated and ſmall ſeeds.

This genus comprehends the white ſhrubby hypericum of authors.

SPIRAL, in geometry, a curve line of the circular kind, which, in its progreſs, recedes from its center.

A ſpiral, according to Archimedes, its inventor, is thus generated: if a right line, as A B (plate CCLIX. fig. 2.) having one end fixed at B, be equally moved round, ſo as with the other end A to deſcribe the periphery of a circle; and, at the ſame time, a point be conceived to move forward equally from B towards A, in the right line B A, ſo as that the point deſcribes that line, while the line generates the circle: then will the point, with its two motions, deſcribe the curve-line B 1, 2, 3, 4, 5, *&c.* which is called the helix or ſpiral line; and the plane ſpace, contained between the ſpiral line and the right line B A, is called the ſpiral ſpace.

If alſo you conceive the point B to move twice as ſlow as the line A B, ſo as that it ſhall get but half way along the line BA, when that line ſhall have formed the circle; and if then you imagine a new revolution to be made of the line carrying the point, ſo that they ſhall end their motion at laſt together, there will be formed a double ſpiral line, and the two ſpiral ſpaces, as you ſee in the figure. From the geneſis of this curve, the following corollaries may be eaſily drawn. 1. The lines B 12, B 11, B 10, *&c.* making equal angles with the firſt and ſecond ſpiral (as alſo B 12, B 10, B 8, *&c.*) are in arithmetical proportion. 2. The lines B 7, B 10, *&c.* drawn any how to the firſt ſpiral, are to one another as the arches of the circle intercepted betwixt B A and thoſe lines. 3. Any lines drawn from B to the ſecond ſpiral, as B 18, B 22, *&c.* are to each other as the aforeſaid arches, together with the whole periphery added on both ſides. 4. The firſt ſpiral ſpace is to the firſt circle as 1 to 3. And, 5. The firſt ſpiral line is equal to half the periphery of the firſt circle; for the radii of the ſectors, and conſequently the arches, are in a ſimple arithmetical progreſſion, while the periphery of the circle contains as many arches equal to the greateſt; wherefore the periphery to all thoſe arches is to the ſpiral lines as 2 to 1.

SPIRAL, in architecture and ſculpture, implies a curve that aſcends, winding about a cone or ſpire, ſo as all the points thereof continually approach the axis. It is diſtinguiſhed from the helix, by its winding around a cone, whereas the helix winds in the ſame manner around a cylinder.

*Proportional* SPIRALS, are ſuch ſpiral lines as the rhumb lines on the terreſtrial globe, which, becauſe they make equal angles with every meridian, muſt alſo make equal angles with the meridians in the ſtereographic projection on the plane of the equator; and therefore will be, as Dr. Halley obſerves, proportional ſpirals about the polar point. See RHUMB.

SPIRAL-STAIRS. See STAIR-CASE.

SPIRATION, or rather RESPIRATION. See the article RESPIRATION.

SPIRE, *ſpira*, in architecture, was uſed by the antients for the baſe of a column, and ſometimes for the aſtragal or tore. But, among the moderns, it denotes a ſteeple that continually diminiſhes as it aſcends, whether conically or pyramidally. See the article STEEPLE.

SPIRE, in geography, an imperial city of Germany, capital of a biſhopric of the ſame name, and ſituated in the palatinate of the Rhine, fifteen miles ſouth-weſt of Heidelburg: eaſt long. 8° 17′, north lat. 49° 16′.

SPIREBACH, a town of Germany, ſituated on a river of the ſame name, eight miles north of Landau.

SPIRIT, *ſpiritus*, in metaphyſics, an incorporeal being or intelligence; in which ſenſe, God is ſaid to be a ſpirit, as are angels and the human ſoul. See the articles GOD, ANGEL, and SOUL.

The word ſpirit is, indeed, uſed in general to denote all thinking intelligent ſubſtances; but it would be the height of folly to imagine, becauſe this name is applied to the Creator as well as to the human ſoul, that therefore they partake of one common nature, and differ only as different modifications of the ſame ſubſtance: wherefore, when we call God a ſpirit, we ought by no means

rashly to presume, that he is so in the same sense in which the human soul is a spirit.

However, though we readily own there may be various ranks of spiritual beings; yet as we have no conceptions of the powers and operations of intellectual natures distinct from those of our own minds, we are necessitated to conceive of them in a manner suited to our knowledge; and when we would rank them into species, according to the degrees of superiority they are imagined in the scale of being, we ascribe to them what we find most excellent in ourselves, as knowledge, thinking, foresight, &c. and those in different measures, proportioned to the station peculiar to each rank. But that this is a very imperfect way of distinguishing the various orders of intellectual beings, needs not many words to make appear; especially if we consider, that the manner of communicating their thoughts without the intervention of bodily organs, is a thing to us altogether incomprehensible; which necessarily leads us to suppose, that they have ways of perception and knowledge, whereof our faculties cannot give us any notice. See the articles ESSENCE, EXISTENCE, and SUBSTANCE.

SPIRITS, or ANIMAL SPIRITS, in physiology. See ANIMAL SPIRITS.

Our perceptions and actions are supposed to depend on the facility with which these spirits pass from the brain to the nerves, and back from the nerves to the brain: for if the brain, the cerebellum, or the spinal marrow is hurt, there happens in all the parts where the nerves are distributed, which proceed from the disordered part, convulsions and palsies; and if any nerve is tied or cut, the parts below the ligature lose their sense and motion, while those above continue in their former state. See the articles BRAIN, CEREBELLUM, MARROW, and NERVES.

SPIRIT, in chemistry, a name applied to several very different substances; however, in general, it denotes any distilled volatile liquor that is not insipid, as phlegm, or pure water, nor inflammable as oil: but under this general idea are comprehended liquors of quite opposite natures, some being acid, and others alkaline; which last are such enemies to the former, that as soon as they are put together, they raise a violent effervescence, and grow hot: and to these may be added a third sort, called vinous or inflammable spirits; which though very subtile and penetrating, are not manifestly either acid or alkaline.

All these sorts of spirits Mr. Boyle shews to be producible: and, 1. The vinous, which nature scarce ever produces of herself, are the creatures of vinous fermentation, or are actually produced, though not separated, in that operation. See the articles FERMENTATION, BRANDY, RUM, RACK, &c.

2. The alkaline or volatile spirits, called also the urinous, by reason of their affinity in many qualities with spirit of urine, are manifestly not simple but compound bodies; consisting of the volatile salt of the respective concretes dissolved in the phlegm, and for the most part accompanied with a little oil: so that these may be referred to the class of volatile salts. See the article SALT.

3. Acid spirits appear to be producible, because those drawn from common salt and nitre are very different in respect of taste, &c. from the bodies they are procured from, which are not properly acid: so that it does not appear that these spirits pre-existed in that state of those bodies.

What farther confirms this doctrine of spirits is, that the same body, merely by different ways of ordering it, may be brought to afford either acid, vinous, or urinous spirits; add, that whereas salt is accounted the principle of all taste, it follows that spirits, being sapid, must contain salt; since it is taste that characterizes and distinguishes it from phlegm, and denominates it acid, vinous, or urinous spirit.

Spirits, distilled from fermented liquors, consist of very different ingredients, *viz.* a pure spirit or alcohol, phlegm, a certain acetous fermented acid, and a small quantity of ill-scented oil; so that it becomes necessary, in order to obtain the spirit perfectly pure, to re-distil it several times, as directed under the articles DISTILLATION and RECTIFICATION.

By reducing spirit, therefore, to the utmost degree of purity, an alcohol is obtained; which, as Dr. Shaw expresses it, is a liquor sui generis, and possessed of many peculiar qualities; as, 1. When absolutely purified, it is an uniform and homogene liquor, capable of no farther separation, without loss or destruction of some of its homogeneous parts. 2. It is totally inflammable, leaving no soot, nor any moisture behind. 3. It has no

no peculiar taſte or flavour, any more than pure water, except what is owing to its nature as alcohol, or perfectly pure ſpirit. 4. It is an unctuous and criſpy fluid, running veiny in the diſtillation, and its drops rolling on the ſurface of any other fluid, like peaſe upon a table, before they unite. 5. It appears to be the eſſential oil of the body it is obtained from, broken very fine, and intimately and ſtrongly mixed with an aqueous fluid, which is aſſimilated, or changed in its nature in the operation. 6. And laſtly, it ſeems to be a kind of univerſal fluid, producible with the ſame properties from every vegetable ſubject; but to produce it thus, requires ſome care in the operation. See ALCOHOL.

On theſe principles is founded the opinion, that all ſpirits may be reduced to a perfect ſimilarity, or ſameneſs, from whatever ſubject they are produced, and on this depends their convertibility into one another; for when once they are brought to this ſtandard of ſimplicity, there needs nothing more than to add the oil of ſuch of the finer ſpirits as is required to convert the ſpirit into that particular kind. By this means the ſame taſteleſs ſpirit, whether obtained from malt, ſugar, or grapes, may be made into either malt ſpirit, brandy, or rum, by adding the eſſential oil of the grape, ſugar, or malt; and thus what was once malt ſpirit, ſhall become brandy, or whatever elſe the operator pleaſes.

Many methods have been attempted to obtain the firſt point, that is, the reducing the ſpirit to perfect and pure alcohol: the moſt practicable means ſeem to be long digeſtion, and the repeated diſtillation from water into water, where the eſſential oil will at once be left upon two ſurfaces, and the acid imbibed: the ſhorter ways, are thoſe by rectifying from neutral abſorbent ſalts and earths; ſuch are ſugar, chalk, and the like; and, laſtly, the uſe of fixed alkalies may be tried, for theſe very forcibly keep down both the phlegm and oil; inſomuch that this laſt method promiſes to be the ſhorteſt of all, if the art were known of utterly aboliſhing the alkaline flavour, which the alcohol is apt to acquire.

For as vinous ſpirits ariſe with a leſs degree of heat than watery liquors, if due regard be had to this circumſtance, very weak ſpirits may, by one or two wary diſtillations, in a degree of heat leſs than that in which water boils, be tolerably well freed of their aqueous phlegm: and in order to free it from its foul oil, add to every gallon of it a pound or two of pure, dry, and fixed alkaline ſalt; which being digeſted together for ſome time, the alkali, from its known property of attracting water and oils, will imbibe the remaining phlegm, and ſuch part of the diſagreeable unctuous matter as may be ſtill left in the ſpirit, and ſink with them to the bottom of the veſſel. If the ſpirit be now again gently drawn over, it will ariſe entirely free from its phlegm and nauſeous flavour; but as ſome particles of the alkaline ſalt are apt to be carried up with it, and give it an urinous reliſh, a ſmall proportion of any fixed acid liquor, or rather of an acid ſalt, as vitriol or alum, ſhould be added to it.

The ſpirit obtained by this proceſs is called alcohol, and is extremely pure, limpid, perfectly flavourleſs, and fit for the fineſt purpoſes: it may be reduced to the ſtrength commonly underſtood by proof-ſpirit, by mixing twenty ounces of it (by weight) with ſeventeen ounces of water. The diſtilled cordials made with theſe ſpirits, are much more elegant and agreeable than when the common rectified or proof ſpirits of the ſhops are made uſe of.

There are many occaſions in which chemiſts, and other artificers, ſtand in need of the true and pureſt alcohol, the leaſt remainder of water rendering the operation unſucceſsful: hence it is abſolutely neceſſary we ſhould have ſome marks, by which to diſtinguiſh whether our alcohol be pure or not. The principal of theſe are, 1. If the ſuppoſed alcohol contains any oil diſſolved in it, and ſo equably diſtributed through it, that it is no ways perceptible, then upon pouring of water into it, the mixture will grow white, and the oil ſeparate from the alcohol. 2. If any thing of an acid lies concealed in the alcohol, a little of it mixed with the alkaline ſpirit of ſal ammoniac will diſcover the acid by an effervescence excited by the affuſion of the acid; for otherwiſe there would be only a ſimple coagulation. 3. If there be any thing of an alkali intermixed, it will appear by the effervescence excited by the affuſion of an acid. 4. But it is a matter of great difficulty to diſcover whether there be any water intermixed with it. The beſt method of doing this is the following: take a chemical veſſel with a long

long narrow neck, the bulb of which will hold four or ſix ounces of alcohol. Fill this two thirds full with the alcohol you intend to examine, into which throw a dram of the pureſt and drieſt ſalt of tartar, coming very hot out of the fire; then mix them by ſhaking them together, and ſet them over the fire till the alcohol is juſt ready to boil. Being thus ſhaken, and heated, if the ſalt of tartar remains perfectly dry, without the leaſt ſign of moiſture, we are ſure that there is no water in the alcohol. The learned Boerhaave tells us, that by this method he diſcovered water in alcohol which had been looked upon as pure, having undergone every other method of trial.

*Medicinal virtues of* SPIRITS. The too free uſe of inflammable or vinous ſpirits, is attended with very bad effects; as the body is thereby greatly attenuated, the ſtrength impaired, and the brain ſtupified. However, as Dr. Pringle juſtly obſerves, we ought not to confound the neceſſary and moderate uſe of ſpirits, with the vice of indulging in them to exceſs. So far, therefore, from thinking the moderate uſe of ſpirits detrimental to ſoldiers, and others, who are expoſed to the extremes of heat and cold, and to moiſt and bad air, that he even recommends it; and as to ſoldiers in particular, he obſerves, that ſpirits, even when drank to exceſs, tend more to weaken the conſtitution than to produce any of the common camp-diſeaſes. Hence, in eſtabliſhing meſſes among the ſoldiers, which he thinks would be attended with many good conſequences, he alſo recommends ſome regulations to be made with regard to an allowance of ſpirits, whether by ſtoppages on the pay or otherwiſe: this he enforces by obſerving that the like practice already obtains in the navy, and probably for the ſame reaſons for which it would be proper in the army; ſince, in ſhips, the men are alſo liable to diſtempers ariſing from moiſt and corrupted air. It is the abuſe, therefore, of vinous ſpirits that ought to be condemned; ſince, taken in moderation, they can do no harm; and if properly accommodated to circumſtances, may have very good effects.

Spirits are alſo of uſe, in external applications, to wounds and ſores; as they ſtimulate the fluids, reſiſt putrefaction, and quicken the pulſe when abſorbed. Tinctures of abſorbent and aromatic powders are often preſcribed with the ſame intention; by reaſon they partake of the nature of their ingredients, but principally of the ſpirit.

As to the volatile ſpirits, diſtilled from animal and other ſubſtances, they are in general extremely pungent and acrimonious; applied to the ſkin, and prevented from exhaling, they inflame the part, and produce the effect of cauſtics; they alſo liquify the animal-juices, and diſſolve the coagula made from them with acids; with which being mixed, they efferveſce, and unite into a neutral ſalt. With regard to their medical virtues, they ſtimulate the nervous ſyſtem, attenuate viſcid humours, promote a diaphoreſis, and other natural ſecretions, and abſorb acidities in the primæ viæ: they are particularly uſeful in the lethargic and apoplectic caſes, in hypochondriacal and hyſterical diſorders, and the languors, head-achs, inflations of the ſtomach, flatulent colics, and other ſymptoms which attend them. However, they are generally found more ſerviceable to aged perſons, and in phlegmatic habits, than in the oppoſite circumſtances: in febrile and inflammatory diſtempers, they are hurtful, except in ſuch fevers as are accompanied with a cough, hoarſeneſs, and redundance of phlegm: they are moſt conveniently exhibited in a liquid form, largely diluted with water, or other convenient liquors; the doſe being from five or ſix to thirty or more drops.

The acid ſpirits drawn from foſſils, and applied to animal bodies, coagulate the fluids, and mortify the ſolids: by being diluted with water, they approach to the nature of vinegar. Metallic ſubſtances, diſſolved in theſe ſpirits, increaſe their corroding ſphacelating quality, ſo as ſometimes to occaſion convulſions.

As for the ſpirituous diſtilled waters, which make no ſmall part of the ſhop-medicines, ſee the article WATER.

SPIRITUAL, in general, ſomething belonging to, or partaking of, the nature of ſpirit. See the article SPIRIT.

The ſpiritual courts, in law, are ſuch as have juriſdiction in matrimonial cauſes, and for probate of wills, and granting adminiſtration of goods; as alſo in regard to tythes, and in caſes of defamation, &c. See the articles COURT, WILL, ADMINISTRATOR, &c.

SPIRITUALITIES *of a biſhop*, are the profits that he receives as a biſhop, and not as a baron of parliament; ſuch are the duties of his viſitation, preſentation-money,

money, what arifes from the ordination and inftitution of priefts, the income of his jurifdiction, &c. See BISHOP.

SPITAL, a town of Carinthia, in Germany: eaft long. 13° 28′, north lat. 47°.

SPITHEAD, a road between Portfmouth and the Ifle of Wight, where the royal navy of Great Britain frequently rendezvous.

SPIT-INSECT, in zoology, the cicada with brown wings, and two white fpots on them, and a double white line. See the article CICADA.

SPITTLE, *faliva*, in phyfiology. See the article SALIVA.

SPITZBERGEN, or GROENLAND. See the article GROENLAND.

SPLACHNUM, in botany, a genus of moffes; the calyx of the male flower is a fmooth, conic calyptra; the antheræ are cylindric, and the receptacle coloured, membranaceous, and very large; the calyx of the female flower, which is on a diftinct vegetable, is ftillated, and the priftilli are numerous, central, fhort, and coloured.

SPLAIT, or SHOULDER-SPLAIT, among farriers. See SHOULDER-SPLAIT.

SPLEEN, σπλὴν, *lien*, in anatomy, is a vifcus of a deep blackifh red colour, fituated on the left fide of the ftomach, under the diaphragm, near the ribs, and above the left kidney. Its figure is fomewhat uncertain; but is ufually like that of a tongue, being hollow towards the ftomach, and convex towards the diaphragm and ribs: however, it is often irregular, and has in many parts fiffures. It is connected with the ftomach, by the vafa brevia, and with the pancreas, omentum, the diaphragm, and left kidney by membranes. Its fize is various, but is ufually five or fix inches long, three broad, and one inch thick, in the human body: in dogs, hogs, and many other animals, it is much larger and thinner.

In human fubjects, the fpleen has but one membrane; but in calves, and fome other animals, it has two: in this cafe, the external one is robuft, common, and adheres but laxly, by means of the fanguiferous veffels, to the inner one, which is proper and very thin, and, when the outer one is taken off, tranfmits the breath.

The veffels of the fpleen, confidering its fize, are remarkably large: its artery is from the cœliac, and is called the fplenic artery; and in human fubjects really tranfmits water, air, or mercury, thrown into it, into the veins: the fplenic vein is, like thofe of the other vifcera, very much ramified, and its branches are carried throughout the whole fpleen; but, in calves, &c. it is foon after its ingrefs into the fpleen, transformed into cells: in calves alfo, both veffels enter at one extremity; but in the human body, they are divided into various branches, and run over the whole concave or internal furface: the nerves of the fpleen are from the plexus fplenicus: the fpleen has no excretory duct; but there are in it lymphatic veffels, running to the receptacle.

The fubftance of the fpleen has been faid to be cellulofe and glandulofe: in calves, indeed, it is cellulofe; but in man, it is vafculofe and fibrofe. What authors have defcribed as glands in the fpleen, Ruyfch has proved to be only veffels; all the glands about the fpleen being only one or two lymphatic ones, of about the bignefs of a bean, fituated without it near where the veffels enter.

The ufe of the fpleen has been much controverted by authors; but the moft probable opinion feems to be, that it ferves to render the blood more fluid, out of which the bile is to be afterwards fecreted; and that by this means obftructions, which muft otherwife be frequent, are prevented, and the fecretion of the bile promoted.

*Infarction of the* SPLEEN. In this cafe, the fpleen fwells, together with the left adjacent region; and fometimes there is a tenfenefs of the belly: this difeafe is increafed by reft, and too rich a diet; and therefore exercife, and a fpare diet are proper; as are acids, as vinegar, or thin and auftere wine; and, in general, all meats and drinks, which have the virtue of promoting urine, as the feeds of trefoil, cummin, parfley, wild thyme, hyffop, and favory; and the herbs rocket, fpleenwort, and creffes. See the article HYPOCHONDRIAC PASSION.

SPLEEN WORT, *lonchitis*. See the article LONCHITIS.

SPLENETIC, a perfon affected with obftruction of the fpleen. See SPLEEN and HYPOCHONDRIAC PASSION.

SPLENIC VESSELS, the artery and vein of the fpleen. See the article SPLEEN.

SPLENIUS, in anatomy, a pair of the extenfor mufcles of the head, which rifing from the lower vertebra of the neck, and the five upper ones of the back, is inferted a little above the maftoide procefs. See the article MUSCLE.

SPLENT, or SPLINT, among farriers, a callous, insensible excrescence, breeding on the shank-bone of horses; which, when it grows big, spoils the shape of the leg, and generally comes upon the inside: but if there be one opposite to it on the outside, it is called a peg, or pinned splent; because it does, as it were, pierce the bone, and is extremely dangerous.

The simple splents are only fastened to the bone, at a pretty distance from the knee, and without touching the back sinew, and have not a very bad consequence; but those that touch the back sinew, or are spread on the knee, will make a horse lame in a short time.

For the cure of this malady, shave away the hair, and rub and beat the swelling with the handle of a shoeing hammer; then having burnt three or four hazzle-sticks, while the sap is in them, chafe the splent with the juice, or water that issues out at both ends, applying it as hot as you can, without scalding the part; after that, rub or bruise the swelling with one of the sticks, and continue frequently to throw the hot juice upon the part, but so as not to scald it, and continue still rubbing it, till it grows soft. Then dip a linen-cloth, five or six times double, in the hazle-juice, as hot as your hands can endure it, and tie it upon the splent, where let it remain for twenty-four hours, keeping the horse in the stable for the space of nine days, not suffering him to be either ridden or led to water; by which time, the splent will be dissolved, and the hair will afterwards grow on it again.

SPLENTS, or SPLINTS, in surgery, pieces of wood, used in binding up broken limbs. See the article FRACTURE.

SPLICING, in the sea-language, is the untwisting the ends of two cables or ropes, and working the several strands into one another by a fidd, so that they become as strong as if they were but one rope. See the article CABLE, &c.

SPLINTER, a small shiver of wood, or the like. The splinters of fractured bones, if loose, are to be carefully removed, otherwise replaced. See the article FRACTURE.

SPODIUM, in pharmacy, one of the foulest recrements of copper; being nothing but the worst and heaviest parts of the cadmia ostracitis, thrown up in such coarse pieces by the blast of the bellows, that it does not adhere to the roof or sides of the furnace, but falls down again into several parts of the furnace; and being collected along with many other kinds of foulnesses, in form of a blackish heavy matter, is indeed no better than the sweepings of the furnaces, where the copper is refined. See the article CADMIA.

SPOILS, *spolia*, whatever is taken from the enemy, in time of war.

Among the antient Greeks, the spoils were divided in common among the whole army, only the general's share was largest; but among the Romans, the spoils belonged to the republic.

SPOLETTO, the capital of Umbria, in Italy; it is situated fifty miles north-east of Rome.

SPONDEE, *spondæus*, in antient poetry, a foot consisting of two long syllables, as *omnes*. See the article FOOT.

Some give the appellation spondaic to verses composed wholly of spondees, or at least that end with two spondees; as,

*Constitit, atque oculis Phrygia agmina circumspexit.*

SPONDIAS, HOG PLUM, in botany, a genus of the enneandria-trigynia class of plants, the flower of which consists of five ovated, plane, and patent petals; and its fruit is an oval berry, containing four nuts in each cell. It is called monbin by Plumier.

SPONDYLUS, in anatomy, a name antiently given to a vertebra of the spina dorsi. See the article VERTEBRÆ.

SPONGIA, SPUNGE, in botany, &c. See the article SPUNGE.

SPONGIOSE, in anatomy, an appellation given to several parts of the body, on account of their porous and cavernous texture, not unlike that of spunge; as the spongiose or ethmoide bone of the nose, the spongiose bodies of the penis. See the articles NOSE and PENIS.

SPONSORS, among christians, are those persons, who, in the office of baptism, answer, or are sureties, for the persons baptized. See the article BAPTISM.

In the antient church, there were three sorts of sponsors, 1. For children, who could not answer for themselves; and in most cases, parents were sponsors for their own children. 2. For such persons as, by reason of sickness or infirmity, were in the same condition with children; who might be baptized, if their friends testified, that they had before-hand desired baptism, and at the same time became their sponsors. 3. For all adult persons in general; for these too had

their ſponſors, as no perſons were baptized without them.

It is obſervable, that antiently no more than one ſponſor was required, namely, a man for a man, and a woman for a woman: however, in the caſe of infants, no regard was had to the difference of ſex; for a virgin might be ſponſor for a male child; and a father for his children, whether male or female.

In the modern chriſtian church, the office of ſponſors, or ſureties in baptiſm, is better known than practiſed; we call them god-fathers and god-mothers. See the article GOD-FATHERS.

SPONTANEOUS, a term applied to ſuch motions of the body, and operations of the mind, as we perform of ourſelves, without any conſtraint. See FREEDOM.

SPONTANEOUS, or EQUIVOCAL GENERATION. See EQUIVOCAL.

SPOON-BILL, *platea*, in ornithology. See the article PLATEA.

SPOONING, in the ſea-language, is ſaid of a ſhip, which, being under ſail in a ſtorm at ſea, is unable to bear it, and conſequently forced to put right before the wind.

SPORADES, among antient aſtronomers, a name given to ſuch ſtars, as were not included in any conſtellation. See the articles CONSTELLATION and STAR.

SPORADIC DISEASES, among phyſicians, are ſuch as ſeize particular perſons at any time or ſeaſon, and in any place; in which ſenſe they are diſtinguiſhed from epidemical and endemic diſeaſes; the former whereof are peculiar to certain times or ſeaſons, and the latter to certain places or countries. See the articles EPIDEMIC and ENDEMIC.

SPORTULA, in roman antiquity, a dole of meat or money, given by great men to the poor.

SPOTS, in aſtronomy, certain places of the ſun's or moon's diſc, obſerved to be either more bright, or darker, than the reſt; and accordingly, called faculæ and maculæ. See the articles FACULÆ and MACULÆ; as alſo SUN and MOON.

SPOUT, or WATER-SPOUT, in natural hiſtory, an extraordinary and dangerous meteor, obſerved at ſea, and ſometimes at land, called by the Latins typho and ſipho. Its firſt appearance is in form of a deep cloud, the upper part of which is white, and the lower black: then from the lower part of this cloud hangs, or rather falls down, what is properly called the ſpout, in form of a conical tube, biggeſt at top; and under this tube, there is always a great boiling and flying up of the water of the ſea, as in a *jet d'eau*. For ſome yards above the ſurface of the ſea, the water ſtands as a column or pillar, from the extremity whereof it ſpreads and goes off, as in a kind of ſmoke. Frequently, the cone deſcends ſo low, as to touch the middle of this column, and continue for ſome time contiguous to it; though ſometimes it only points to it, at ſome diſtance, either in a perpendicular or oblique line. Frequently it is ſcarce diſtinguiſhable, whether the cone or the column appear the firſt, both appearing all of a ſudden againſt each other. But ſometimes the water boils up from the ſea to a great height, without any appearance of a ſpout pointing to it, either perpendicularly or obliquely. Indeed, generally, the boiling or flying up of the water has the priority, this always preceding its being formed into a column. Generally, the cone does not appear hollow, till towards the end, when the ſea-water is violently thrown up along its middle, as ſmoke up a chimney. Soon after this, the ſpout or canal breaks and diſappears; the boiling up of the water, and even the pillar, continuing to the laſt, and for ſome time afterwards; ſometimes till the ſpout form itſelf again, and appear anew; which it ſometimes does ſeveral times in a quarter of an hour. See plate CCLIX. fig. 3.

M. de la Pyme, from a near obſervation of two or three ſpouts in Yorkſhire, deſcribed in the Philoſophical Tranſactions, gathers that the water-ſpout is nothing but a gyration of clouds by contrary winds, meeting in a point or center; and there, where the greateſt condenſation and gravitation is, falling down into a pipe or great tube, ſomewhat like Archimedes's ſpiral ſcrew; and, in its working and whirling motion, abſorbing and raiſing the water, in the ſame manner as the ſpiral ſcrew does; and thus deſtroying ſhips, &c. Thus, June the 21ſt, he obſerved the clouds mightily agitated above and driven together; upon which they became very black, and were hurried round, whence proceeded a moſt audible whirling noiſe, like that ordinarily heard in a mill. Soon after, iſſued a long tube or ſpout, from the center of the congregated clouds, wherein he obſerved a ſpiral motion like that of a ſcrew; by which the water was raiſed up.

up. Again, August 15, 1687, the wind, blowing at the same time out of several quarters, created a great vortex and whirling among the clouds; the center whereof, every now and then, dropped down, in shape of a long, thin, black pipe, wherein he could distinctly behold a motion like that of a screw, continually drawing upwards, and screwing up, as it were, wherever it touched. In its progress it moved slowly over a grove of trees, which bent under it like wands in a circular motion. Proceeding, it tore off the thatch from a barn, bent a huge oak-tree, broke one of its greatest branches, and threw it to a great distance. He adds, that, whereas it is commonly said, the water works and rises in a column, before the tube comes to touch it; this is doubtless a mistake, owing to the fineness and transparency of the tubes, which do most certainly touch the surface of the sea, before any considerable motion can be raised therein; but which do not become opake and visible, till after they have imbibed a considerable quantity of water.

The dissolution of water-spouts he ascribes to the great quantity of water they have glutted; which by its weight impeding their motion, whereon their force, and even existence, depends, they break and let go their contents; which use to prove fatal to whatever is found underneath. A notable instance hereof we have in the Philosophical Transactions, related by Dr. Richardson; for a spout in 1718 breaking on Emott moor, nigh Coln, in Lancashire, the country was immediately overflowed.

In Pliny's time, the seamen used to pour vinegar into the sea, to assuage and lay the spout, when it approached them: our modern seamen keep it off, by making a noise with filing and scratching violently on the deck, or by discharging great guns to disperse it.

SPOUTING FOUNTAIN. See the article FOUNTAIN.

SPRAIN, or STRAIN. See STRAIN.

SPRAT, in ichthyology, a species of clupea, with the lower jaw longest, and the belly very acute. See CLUPEA.

The sprat has been generally, but erroneously, supposed a herring, not grown to its full size; its usual length is about four or five inches, and its breadth somewhat more, in proportion, than in the herring; there is a spot on each side, near the extremity of the coverings of the gills. It is caught in most of our seas, and brought in surprising quantities to London.

SPREE, a river of Germany, which, rising in Bohemia, runs northward, through Lusatia, and, entering Brandenburg, visits Berlin, and falls into the Havel, a little west of that city.

SPRING, *fons*, in natural history, a fountain or source of water, rising out of the ground. See the article WATER.

Various have been the opinions of philosophers concerning the origin of springs; but those, which deserve notice, are only the three following ones.

1. That the sea-water is conveyed thro' subterraneous ducts, or canals, to the places where the springs flow out of the earth: but as it is impossible that the water should be thus conveyed to the tops of mountains, since it cannot rise higher than the surface, some have had recourse to subterraneous heats; by which being rarified, it is supposed to ascend in vapours through the bowels of the mountains. But as no sufficient proof is brought of the existence of these central heats, or of caverns in the mountains big enough to let the vapours ascend, supposing such heats, we shall not take up our reader's time with a formal refutation of this hypothesis.

2. As to those who advance the capillary hypothesis, or suppose the water to rise from the depths of the sea through the porous parts of the earth, as it rises in capillary tubes, or through sand or ashes, they seem not to consider one principal property of this kind of tube, or this sort of attraction: for though the water rise to the top of the tube or sand, yet will it rise no higher, because it is by the attraction of the parts above that the fluid rises, and where that is wanting it can rise no farther. Therefore, though the waters of the sea may be drawn into the substance of the earth by attraction, yet it can never be raised by this means into a cistern, or cavity, to become the source of springs.

3. The third hypothesis is that of the sagacious naturalist, Dr. Halley, who supposes the true sources of springs to be melted snow, rain-water, dew, and vapours condensed.

Now in order to prove, that the vapours, raised by the heat of the sun, from the surface of the seas, lakes, and rivers, are abundantly sufficient to supply the springs and rivers with fresh water, the doctor made

made the following experiment: he took a veſſel of water, made of the ſame degree of ſaltneſs with that of the ſea, by means of the hydrometer; and having placed a thermometer in it, he brought it, by means of a pan of coals, to the ſame degree of heat with that of the air in the hotteſt ſummer. He then placed this veſſel with the thermometer in it, in one ſcale, and nicely counterpoiſed it with weights in the other; after two hours, he found, that about the ſixtieth part of an inch was gone off in vapour, and conſequently in twelve hours, the length of a natural day, one tenth of an inch would have been evaporated.

From this experiment it follows, that every ten ſquare inches of the ſurface of the water yield a cubic inch of water in vapour per day, every ſquare mile 6914 tons, and every ſquare degree (or 69 engliſh miles) 33 millions of tons. Now, if we ſuppoſe the Mediterranean to be 40 degrees long, and 4 broad, at a medium, which is the leaſt that can be ſuppoſed, its ſurface will be 160 ſquare degrees, from whence there will evaporate 5280 millions of tons per day, in the ſummer-time. See the article SEA.

The Mediterranean receives water from the nine great rivers following, *viz.* the Iberus, the Rhine, the Tyber, the Po, the Danube, the Neiſter, the Boryſthenes, the Tanais, and the Nile; all the reſt being ſmall, and their water inconſiderable. Now let us ſuppoſe that each of theſe rivers conveys ten times as much water to the ſea as the Thames; which, as is obſerved, yields daily 76,032,000 cubic feet, which is equal to 203 millions of tons; and therefore all the nine rivers will produce 1827 millions of tons; which is little more than one third of the quantity evaporated each day from the ſea. The prodigious quantity of water remaining, the doctor allows to rains, which fall again into the ſeas, and for the uſes of vegetation, *&c.*

As to the manner in which theſe waters are collected, ſo as to form reſervoirs for the different kinds of ſprings, it ſeems to be this: the tops of mountains, in general, abound with cavities, and ſubterraneous caverns formed by nature to ſerve as reſervoirs; and their pointed ſummits, which ſeem to pierce the clouds, ſtop thoſe vapours which fluctuate in the atmoſphere, and being conſtipated thereby, they precipitate in water, and by their gravity eaſily penetrate through beds of ſand and lighter earth, till they are ſtopped in their deſcent by more denſe ſtrata, as beds of clay, ſtone, *&c.* where they form a baſon or cavern, and work a paſſage horizontally, and iſſue out at the ſide of the mountain.

Many of theſe ſprings running down by the vallies, between the ridges of hills, and uniting their ſtreams, form rivulets or brooks; and many of theſe, again, uniting on the plain, become a river.

*Different ſorts of* SPRINGS. Springs are either ſuch as run continually, called perennial; or ſuch as run only for a time, and at certain ſeaſons of the year, and therefore called temporary ſprings. Others again are called intermitting ſprings, becauſe they flow and then ſtop, and flow and ſtop again: and, finally, reciprocating ſprings, whoſe waters riſe and fall, or flow and ebb, by regular intervals. In order to account for theſe differences in ſprings, let ABCDE (plate CCLIX. fig. 4.) repreſent the declivity of a hill, whoſe ſection, from top to bottom, is ſhewn in the figure; in which let FGH be a cavern or baſon near the top, which collects the water gleeting through the ſtrata, and has a drain or duct leading to the ſide of the hill at B. It is evident, that, when the water ariſes to the drain H, it will deſcend through it to B, where it will break out in form of a fountain or ſpring, and will continue running while the reſervoir is ſupplied with water above the level FH, and after that it will become dry. Hence we ſee that a ſpring may be formed near the tops of the higheſt hills and mountains; but, on the very tops, it is impoſſible for them to be generated.

Intermitting ſprings, or thoſe which flow and ſtop by regular alternations and intermiſſions, may be thus accounted for: let IKL (*ibid.*) repreſent a cavity in the mountain, to which, at I, there is a feeding ſtream which brings the water from other parts; and at K, on the lower part, there goes a duct K*k*C, of a curved or crooked form, which conveys the water to the ſide of a hill at C, where it breaks out into a ſpring. Now, it is evident, that, as the water riſes in the cavern, it will alſo riſe in the duct, till the ſurface of the water IL be level with the higheſt part *k* of the duct, and then the water will deſcend from *k* to C, which point, being lower than the orifice

orifice of the duct at K, will exhauſt the cavern of all its water, and then the ſpring will ſtop, till the ciſtern is repleniſhed to the ſame level I K, by the feeding ſtream I, and then the fountain will play again. An artificial fountain of this kind may be alſo eaſily made.

Reciprocating ſprings, or thoſe which flow and ebb alternately, are occaſioned in the following manner: let M N O (*ib.*) repreſent a reſervoir, fed by the ſtream P M, and alſo a ſiphon K *k* O, which brings water from another cavity above, as I K L; the duct N D carries the water to the ſide of the hill at D, and there makes a conſtant ſpring by virtue of a conſtant ſupply of water by the drain P M. The water at D will alſo flow and ebb alternately; for when the ſiphon K *k* O works, the ſurface of the water M O will be ſuddenly raiſed, and preſs upon the water at N with a greater force, by which means it will iſſue out at D with a greater velocity, and raiſe the ſurface, if confined; but when the ſiphon intermits or ceaſes, the momentum of the water at D is not ſo great as before, and then the ſpring will ſink or decreaſe.

In like manner we account for the riſing of water in wells. Thus ſuppoſe a well be ſunk at the foot of the hill at E, (*ibid.*) to ſuch a depth E V, as will bring the diggers to an eruption of a ſpring at V, whoſe water is brought by the duct R V (or many of them) from a cavity Q R S in the hill (or otherwiſe from a pond, a river, the ſea, &c.) it is evident the water in the well will riſe from the bottom V, to an altitude V T, where the ſurface of the water at T is upon a level with that in the reſervoir Q S, and thus conſtitutes a well.

Now, though every thing may not happen preciſely in the manner, as here repreſented, yet that it is in ſome way analogous to it, we believe no perſon will doubt, who has been at the Peak in Derbyſhire, or at Wookey-hole in Somerſetſhire, and ſeen the wonderful caverns, receptacles, and ſtreams of water, which nature has there furniſhed in the bowels of the mountains.

*Medicinal virtues*, &c. *of* Springs. Theſe are owing to the different qualities and temperament of the ſtrata through which theſe waters may be collected, or paſs: if thoſe reſervoirs of water in the body of mountains be ſituated where mineral ores abound, or the ducts and feeding ſtreams run through mineral earths, it is eaſy to conceive that particles of metal will mix with, and be abſorbed by the water, which being ſaturated therewith, becomes a mineral ſpring or well. If ſalt, ſulphur, lime-ſtone, &c. abounds in the ſtrata, through which the water paſſes, it will then be ſaline, ſulphureous, lime-water, &c. If ſulphur and iron ſhould both abound in the parts of the hill, whence the waters come, the waters will partake of the warmth or heat which is occaſioned by the mixture of two ſuch ſubſtances in the earth, where they are found. See the articles Mineral *waters*, Chalybeate, Sea, Bath, &c.

Spring, *ver*, in coſmography, implies one of the ſeaſons of the year; commencing, in the northern parts of the world, on the day the ſun enters the firſt degree of aries, which is about the twenty-firſt of March, and ending when the ſun leaves gemini. See Equinox and Seasons.

Spring, *elater*, in mechanics, denotes a thin piece of tempered ſteel, or other elaſtic ſubſtance; which, being wound up, ſerves to put ſeveral machines in motion by its elaſticity, or endeavour to unbend itſelf: ſuch is the ſpring of a clock, watch, and the like. See the articles Elasticity, Clock, Watch, &c.

The ſpring of a lock, gun, piſtol, or the like, is a piece of ſteel, violently bent; which, being ſet at liberty, beats back the bolt of the lock, or ſtrikes down the cock.

Spring-tide. See the article Tides.

SPRINGE, among ſportſmen, a device made of twiſted wire, to catch birds or ſmall beaſts.

SPRINGING *of a maſt*, in the ſea-language, is when it cracks, but is not quite broken in any part of it; as the partners, hounds, &c. See the articles Mast, Partners, &c.

Springing *a leak*. See the article Leak.

SPRINGY bodies, the ſame with elaſtic ones; or ſuch as, having had their figure changed by the ſtroke of another body, can recover again their former figure, which bodies not elaſtic cannot do. See the article Elasticity.

SPROTAW, a town of Sileſia, 15 miles weſt of Glogaw: eaſt long. 15° 45′, north lat. 51° 36′.

SPUNGE, *ſpongia*, in botany, a genus of ſubmarine plants, belonging to the cryptogamia lithophyta claſs: it conſiſts of a ſoft, tough, and elaſtic matter, formed uſually into rude maſſes of a cavernous ſtructure, and having very little of the appearance of plants.

Upon

Upon a nice examination, ſpunge appears to be compoſed of capillary fibres, which are hollow and implicated in a ſurpriſing manner; and are ſurrounded by thin membranes which arrange them into a cellular form. This ſtructure, no leſs than the conſtituent matter, of ſpunge, renders it the fitteſt of all bodies to imbibe a great quantity of any fluid, and upon a ſtrong preſſure to part with almoſt the whole quantity again.

Spunge pays, on importation, a duty of $7\frac{75}{100}$d. the pound; and draws back, on exportation, $6\frac{80}{100}$d.

Spunge calcined to a blackneſs, and reduced to powder, has been lately brought into great uſe as a ſweetner of the blood, and a diuretic: ſome have pretended even to cure leproſies with it, and others have extolled it againſt the bite of a mad dog; but theſe are virtues leſs certainly known of it.

In the larger and coarſer pieces of ſpunge, there are often ſmall ſtones found imbedded in the ſubſtance of the matter; and yet, more frequently, a cruſtaceous ſparry matter gathered round the ſurface of certain parts of the plants; both theſe ſubſtances are called by the common name of lapis ſpongiæ, the ſponge-ſtone; and both are recommended as diuretics, and remedies againſt the ſtone and gravel. See the article SPAR.

*Pyrotechnical* SPUNGES, are made of the large fungous excreſcences growing on old oaks, aſhes, fir, *&c.* which being boiled in common water, then dried and well beaten, are put in a ſtrong lye prepared with ſalt-petre, and again dried in an oven. Theſe make the black match or tinder brought from Germany, uſed to receive and ſuſtain the fire ſtruck from a flint and ſteel, *&c.*

SPUNGE, is alſo uſed, in gunnery, for a long ſtaff or rammar with a piece of ſheep or lamb-ſkin wound about its end, to ſerve for ſcouring great guns, when diſcharged, before they are charged with freſh powder.

SPUNGE *of a horſe ſhoe*, the part next the heel, where the calkins are made. See the article HORSE SHOES.

SPUNGING, in gunnery, the cleaning a gun's inſide with a ſpunge, in order to prevent any ſparks of fire from remaining in her, which would endanger the life of him who ſhould load her again.

SPUN-YARN, among ſailors, is a kind of line made from rope-yarn, and uſed for ſeizing or faſtening things together.

SPUNK, one of the names of the female agaric. See the article AGARIC.

SPUR, a piece of metal, conſiſting of two branches encompaſſing a horſeman's heel, and a rowel in form of a ſtar, advancing out behind, to prick the horſe.

SPUR-SHELL, *eperon*, in natural hiſtory, a ſpecies of cochlea, with the edges of its volutions ſerrated; ſo that, in ſeveral poſitions, it reſembles a ſpur with large rowels. See plate CCLIX. fig. 6. and the article COCHLEA.

SPUR-WAY, a road through another's ground, through which one may ride, by right or cuſtom.

SPURGE, in botany, the engliſh name of the euphorbia. See EUPHORBIA.

SPURGE-LAUREL, *daphne.* See the article DAPHNE.

SPURIOUS DISEASES, ſuch as, in ſome ſymptoms, cannot be reduced to any one kind; and, therefore, are denominated from thoſe with which they agree in moſt particulars: thus we ſay, a ſpurious or baſtard pleuriſy, quinzy, *&c.* See the articles PLEURISY, QUINZY, *&c.*

SPURKETS, in a ſhip, ſpaces between the upper and lower futtocks, or betwixt the rungs fore and aft.

SPURRY, in botany, the engliſh name of ſeveral ſpecies both of alſine and ſpergula. See ALSINE and SPERGULA.

SPUTUM, among phyſicians, denotes the ſame with the ſaliva, or ſpittle. See the article SALIVA.

SPY, a perſon hired to watch the actions, motions, *&c.* of another; particularly of what paſſes in a camp. When a ſpy is diſcovered, he is hanged immediately.

SQUACCO, in ornithology, a bird of the heron kind, of a yellowiſh colour, and the head and neck variegated with black, white and yellow. It is a native of the coaſt of the Levant. See HERON.

SQUADRON, in military affairs, denotes a body of horſe whoſe number of men is not fixed; but is uſually from one to two hundred.

Each ſquadron uſually conſiſts of three troops, of fifty men each. See the articles ARMY and HORSE.

SQUADRON *of ſhips*, a diviſion or part of a fleet, commanded by a vice-admiral, or commodore. See FLEET and NAVY.

SQUAIOTTA, in ornithology, a ſpecies of heron, of a brown colour, with a black and white creſt, ſomewhat larger than the ſquacco, or former ſpecies.

SQUALUS, the SHARK-KIND, in ichthyology, a numerous genus of fiſhes, of the chon-

chondropterygious order; the characters of which are these: the foramina of the gills are five on each side, and are situated in a longitudinal direction, from the sides of the head down to the pectoral fins; the head is of a depressed form; the body is oblong, and is either rounded or angulated, and the skin is rough; the eyes stand on the sides of the head; the tail is bifid, and the upper part longer than the under; the mouth is usually transverse, and in the under part of the rostrum, not at its extremity.

The species of this genus, being very numerous, are arranged under the following subdivisions. 1. Those which have granulated teeth, as the saw-fish, and the smooth hound-fish. 2. Those which have acute teeth, and prickles on the back; as the common hound-fish, the shagreen-fish, centrine and monk-fish. 3. Those which have acute teeth, but no spines or prickles on the back; as the zygæna, or ballance fish, the sea-fox, and the tope. 4. Those which have the rostrum shorter than usual; as the bounce, morgag, and blue and white sharks. See the articles SAW-FISH, HOUND-FISH, &c.

SQUAMÆ, SCALES, in natural history. See the article SCALE.

SQUAMARIA, in botany, a genus of the didynamia-angiospermia class of plants, with a monopetalous ringent flower, both lips of which are entire, only the upper one is longest; the fruit is a roundish unilocular capsule, containing a great many round seeds.

SQUAMOUS, or SQUAMOSE, in anatomy, an appellation given to the spurious or false sutures of the skull, because composed of squamæ or scales like those of fishes, or like tiles laid so as to reach over one another. See the article SKULL.

SQUARE, *quadratum*, in geometry, a quadrilateral figure, both equilateral and equiangular.

To find the area of a square, seek the length of one side; multiply this by itself, and the product is the area of the square.

SQUARE-NUMBER, the product of a number multiplied into itself. See the articles INVOLUTION and POWER.

Thus 4, the product of 2 multiplied by 2; or 16, the product of 4 multiplied by 4, are square numbers.

SQUARE ROOT, a number considered as the root of a second power or square number; or a number, by whose multiplication into itself, a square number is generated. See the article EXTRACTION.

SQUARE BATTLE, or BATTALION *of men*, is one that hath an equal number of men in rank and file. See BATTLE.

*Hollow* SQUARE, in the military art, is a body of foot drawn up with an empty space in the middle for the colours, drums, and baggage; faced and covered by the pikes every way, to keep off horse.

SQUARE, *norma*, an instrument consisting of two rulers, or branches, fastened perpendicularly at one end of their extremes, so as to form a right angle: it is of great use in the description and mensuration of right angles, and laying down perpendiculars.

SQUATT, among miners, a small bed of ore less valuable than a vein or load, as reaching only a little way.

SQUATINA, the MONK-FISH, or ANGEL-FISH, a species of squalus, with the mouth at the extremity of the head: it grows to about six feet in length, and is considerably thick in proportion. See the article SQUALUS.

SQUILL, *scilla*, in botany. See SCILLA.

SQUILLA, in zoology, a genus of insects with ten legs, the foremost pair of which is cheliform, or made for pinching: the eyes are two, and the tail is foliated.

These are the characters of the shrimp, as also of the cray-fish, lobster, and crab; of each of which there are numerous species. See the article CANCER, &c.

SQUILLACE, a bishop's see of the farther Calabria, in the kingdom of Naples, which gives name to the gulph of Squillace: east long. 17°, north lat. 39°.

SQUINANCY, or ESQUINANCY, in medicine, the same with the quinzy. See the article QUINZY.

SQUINTING, *strabismus*, in medicine and surgery. See the article STRABISMUS.

SQUIRREL, *sciurus*, in zoology, the english name of a genus of quadrupeds of the order of the glires, the fore-teeth of which are prominent; it has no canine teeth; and its legs are formed both for climbing and leaping.

The common reddish-brown squirrel, with a white belly, is a very lively little animal, with an extremely long and bushy tail. See plate CCLIX. fig. 5.

But besides this, there are several other species; as the american grey-squirrel, with a smaller tail, and twice as large as the common kind; the ceylon blackish squirrel, with a very large tail, and about the size of the common squirrel; the flying squirrel, with the sides extended, a

as to be able to leap from one tree to another at a great diſtance; and, laſtly, the barbary ſquirrel, of a blackiſh tawney-brown colour, with variegated ſides.

ST, an indeclinable term chiefly uſed to command ſilence.

The Romans had theſe two characters written over the doors of their eating rooms, as if one ſhould ſay *ſed tace*, or *ſilentium tene.* Porphyry obſerves, that the antients made a point of religion of it, not to ſpeak a ſingle word in paſſing in or out of the doors.

STABLE, a place or houſe for horſes, *&c.* furniſhed with ſtalls and proper apartments to contain their food, *&c.* See the article HORSE, *&c.*

Nothing conduces more to the health of a horſe than the having a good and wholeſome ſtable. The ſituation of a ſtable ſhould always be in a good air, and on a firm, dry, and hard ground, that in winter the horſe may go out and come in clean. It ſhould always be built ſomewhat on an aſcent, that the urine and other foulneſſes may be eaſily conveyed away by means of trenches or ſinks for that purpoſe. As there is no animal that delights more in cleanlineſs than the horſe, or that more abominates bad ſmells, care ſhould be taken that there be no hen-rooſt, hog-ſtie, or neceſſary houſe, near the place where the ſtable is to be built; for the ſwallowing of feathers, which is very apt to happen when hen-rooſts are near, often proves mortal to horſes; and the ſteams of a bog-houſe, or hog's-dung, will breed many diſtempers. The walls of a ſtable, which ought to be of brick rather than ſtone, ſhould be made of a moderate thickneſs, two bricks, or a brick and a half at leaſt, for the ſake of warmth in the winter, and to keep out the heat in the ſummer. The windows ſhould be made on the eaſt and north ſide of the building, that the north wind may be let in to cool the ſtables in the ſummer, and the riſing ſun all the year round, eſpecially in winter. The windows ſhould either be ſaſhed, or have large caſements, for the ſake of letting in air enough; and there ſhould always be cloſe wooden ſhutters, that the light may be ſhut out at pleaſure, by which means the horſe may be made to ſleep in the day as well as in the night, when it is judged proper he ſhould do ſo. Many pave the whole ſtable with ſtone, but that part which the horſe is to lie on ſhould be boarded with oak-planks, which ſhould be laid as even as poſſible, and croſs-wiſe rather than length-wiſe; and there ſhould be ſeveral holes bored through them to receive the urine, and carry it off underneath the floor into one common receptacle: the ground behind ſhould be raiſed to a level with the planks, and it ſhould be paved with ſmall pebbles. There are two rings to be placed on each ſide of the ſtall, for the horſe's halter to run through, and a logger is to be fixed to the end of this ſufficient to poiſe it perpendicularly, but not ſo heavy as to tire the horſe, or to hinder him from eating; the beſt place for him to eat his corn in is a drawer or locker, made in the wainſcot partition, which need not be large, ſo that it may be taken out at pleaſure to clean it, by which means the common dirtineſs of a fixed manger may be avoided. Many people are againſt having a rack in their ſtables; they give the horſe his hay ſprinkled upon his litter, and if they think he treads it too much, they only nail up three or four boards, by way of a trough, to give it to him in; the reaſon of this is, that the continual lifting up of the head to feed out of the rack, is an unnatural poſture for a horſe, who was intended to take his food up from the ground, and makes him, as they expreſs it, withy cragged. When there is ſtable-room enough, partitions are to be made for ſeveral horſes to ſtand in; theſe ſhould always allow room ſufficient for the horſe to turn about and lie down conveniently, and they ſhould be boarded up ſo high towards the head, that the horſes placed in ſeparate ſtalls may not be able to ſmell at one another, nor moleſt each other any way. One of theſe ſtalls ought to be covered in, and made convenient for the groom to lie in, in caſe of a match, or the ſickneſs of a horſe. Behind the horſes there ſhould be a row of pegs, to hang up ſaddles, bridles, and other utenſils; and ſome ſhelves for the bruſhes, pots of ointments, *&c.* The other requiſites for a ſtable are a dung-yard, a pump, and a conduit.

STABLE-STAND, in the foreſt law, is one of the four evidences or preſumptions whereby a perſon is convicted of an intention to ſteal the king's deer in the foreſt; as when any perſon is found, at his ſtand in the foreſt, with his bow bent

bent ready to ſhoot at a deer, or ſtanding cloſe by a tree with grey-hounds in a leaſh, ready to ſlip. See FOREST.

STABLO, a town of Germany, in the circle of Weſtphalia and biſhopric of Liege, ſituated ten miles ſouth of Limburg.

STACK *of wood*, among huſbandmen, a pile of wood three feet long, and as many broad, and twelve feet high.

STACHYS, BASE HOAR-HOUND, in botany, a genus of the didynamia-gymnoſpermia claſs of plants, the corolla whereof conſiſts of a ſingle ringent petal; the tube is very ſhort; there is no pericarpium; the calyx contains four oval and angular ſeeds.

This plant is cephalic, diuretic, and a promoter of the menſes.

STADIUM, an antient greek long meaſure. See the article MEASURE.

Stadium was alſo the courſe or career wherein the Greeks ran their races. Vitruvius deſcribes it as an open ſpace 125 paces long, terminated at the two extremes with two poſts called by the Romans *carcer* and *meta*. Along the ſtadium was built a kind of amphitheatre, where the ſpectators were placed to ſee the athletæ exerciſe running, wreſtling, *&c.* There were ſtadia likewiſe covered over with colonnades and porticos, ſerving for the ſame exerciſes in bad weather.

STADE, a town of Germany, in the circle of Lower Saxony and dutchy of Bremen, ſituated on the weſt ſide of the river Elbe, ſeventeen miles weſt of Hamburgh.

STADTHOLDER, STADTHOULDER, or STATHOLDER, the principal governor or magiſtrate of the united provinces.

The ſtadtholder ſeems to be impowered, either directly or by his influence, to change both the deputies, magiſtrates, and officers in every province and city. He is preſident in the ſtates of every province, though he has not ſo much as a ſeat or vote in the ſtates-general: but as he influences the ſtates of each province to ſend what deputies he pleaſes to the ſtates-general, he has, in effect, the appointing the perſons that conſtitute the ſtates-general, and may be deemed ſovereign of the united provinces. The ſtadtholders had once a very great power. We find one of their ſtadtholders appointing what towns ſhould ſend deputies, or members, to the aſſembly of the ſtates of Holland: but the ſtadtholderſhip was never hereditary till now, when in the year 1747 it was made ſo in the family of Orange.

It is obſerved that the ſtates paſſed by the ſtadtholder's eldeſt ſon, and appointed his younger ſon, prince Maurice of Orange, their ſtadtholder: and at other times they have ſuppreſſed the ſtadtholderſhip intirely. The ſtadtholder always, in the council of ſtate, when the votes happen to be equal, has a deciſive voice.

STAEHELINA, in botany, a genus of the ſyngeneſia-polygamia-æqualis claſs of plants, the general corolla whereof conſiſts of uniform floſcules ſcarce riſing above the cup: the proper corolla is monopetalous and funnel-ſhaped: the limb is quinquifid, equal, acute, and campanulated: there is no pericarpium: the ſeed contained in the cup is ſolitary, oblong, very ſhort, tetragonal, and coronated with a downy pap of the length of the cup.

STAFF, *baculus*, an inſtrument ordinarily uſed to reſt on in walking. The ſtaff is alſo frequently uſed as a kind of natural weapon both of offence and defence, and for ſeveral other purpoſes.

STAFF, in muſic, five lines on which, with the intermediate ſpaces, the notes of a ſong, or piece of muſic, are marked. Guido Aretin, the great improver of modern muſic, is ſaid to be the firſt who introduced the ſtaff, marking his notes by ſetting points ( . ) up and down them to denote the riſe and fall of the voice; and each line and ſpace he marked at the beginning of the ſtaff with pope Gregory's ſeven letters, A, B, C, D, E, F, G. See the article NOTE.

But others will have this practice of an older date; and Kircher particularly affirms, that in the Jeſuits Library at Meſſina, he found a greek manuſcript of hymns above ſeven hundred years old, wherein ſome hymns were written, on a ſtaff of eight lines, marked at the beginning with eight greek letters. The notes, or points, were on the lines, but no uſe made of the ſpaces.

STAFF, BASTON, or BATTON, in heraldry. See the article BASTON.

*Back*-STAFF. See BACK-STAFF.

*Fore*-STAFF. See FORE STAFF.

*Paſtoral*-STAFF. See PASTORAL-STAFF.

STAFF-OFFICERS. See OFFICERS.

STAFFORD, the county town of Staffordſhire, is ſituated one hundred and thirty miles north-weſt of London.

It ſends two members to parliament.

The county of Stafford is bounded by Che-

Chefhire, on the north-weft; by Derbyfhire, on the north eaft; by Worcefterfhire, on the fouth; and by Shropfhire, on the weft.

STAG, in zoology, a fpecies of the cervus, with ramofe, cylindric and crooked horns. See the article CERVUS.

This is a very ftately and beautiful animal. People are apt to confound it with the common fallow deer, but with great impropriety, being of twice the fize, and different in many other refpects: the head is remarkably large: the neck ftrong and thick: the eyes are full and large: the ears long and patulous: the horns tall, almoft erect, and of a beautiful form; they rife each with a fingle and elegant ftem, which continues its form to the top, only fending off branches and divarications: they are hairy when once formed, but afterwards they become very ftrong and lofe that downy appearance. The body of the ftag is rounded and plump: the back fomewhat flatted, and the belly prominent: the legs are long: the hoofs cloven: the fur deep, thick, and of a tawny-reddifh colour.

STAG-BEETLE. See CERVUS-VOLANS.

STAG-HUNTING. See HUNTING.

STAGE, in the modern drama, the place of action and reprefentation, included between the pit and the fcenes, and anfwering to the profcenium, or pulpitum, of the antients.

The laws of the ftage are the rules and decorums to be obferved, with regard to the œconomy and conduct of a dramatic performance to be exhibited on the ftage. Thefe relate principally to the unities, the difpofition of the acts and fcenes, the unravelling, &c. See the articles DRAMA, ACTION, &c.

STAGGERS, or STAVERS, in the manege. See the article STAVERS.

STAIN, a town of Germany, in the circle of Auftria, fituated on the Danube, one hundred and forty miles weft of Vienna.

STAINES, a town of Middlefex, fituated nineteen meafured miles weft of London.

STAIR-CASE, in architecture, an afcent inclofed between walls, or a balluftrade, confifting of ftairs, or fteps, with landing-places and rails, ferving to make a communication between the feveral ftories of a houfe.

The conftruction of a complete ftair-cafe is one of the moft curious works in architecture. The common rules to be obferved therein are as follow: 1. That it have a full free light, to prevent accidents of flipping, falling, &c. 2. That the fpace over head be large and airy, which the Italians call *un bel sfocato*, i. e. good ventilation, in regard a man fpends much breath in mounting. 3. That the half-paces, or landing-places, be conveniently diftributed for repaffing in the way. 4. That to prevent rencounters, &c. the ftair-cafe be not too narrow: however, this laft is to be regulated by the quality of the building. 5. That care be taken in placing the ftair-cafe, fo as the ftairs may be diftributed without prejudice to the reft of the building.

The kinds of ftair-cafes are various: in fome the ftairs are ftraight, in others winding, in others both ways, or mixed. Again, of ftraight ftairs, called alfo fliers: fome fly directly forwards, others are fquare, others triangular, and others are called french flights. Of winding-ftairs, called alfo fpiral or cockle-ftairs: fome are fquare, fome circular, and fome elliptical: and thefe again are various; fome winding round a folid, and others round an open newel. Laftly, of mixed-ftairs: fome are called dog-legged, others both wind about a folid newel, and fly about a fquare open newel.

Stair-cafes being of great importance in building, it will be neceffary to give a particular account of each kind. Firft, ftraight-ftairs are fuch as always fly; that is, proceed in a right line, and never wind; whence their denomination. Of thefe there are feveral kinds, as, 1. Straight-fliers, or plain-fliers, which proceed directly from one floor to another, without turning either to the right or left: thefe are feldom ufed, except either for garret or cellar-ftairs. 2. Square-fliers, which fly round the fides of a fquare newel, either folid or open, having at every corner of the newel a fquare half ftep, taking up one fourth of a circle, fo that they fly from one half pace, or ftep, to another; and the length of the ftairs is perpendicular to the fide of the newel. 3. Triangular-fliers are thofe which fly round by the fides of a triangular newel, either folid or open, having at each corner of the newel a trapezial half-ftep, taking up two thirds of a circle, fo that they fly from one half ftep to another, and their length is perpendicular to the fide of the newel. 4. French fliers, thofe which fly firft di-

rectly forwards, till they come within the length of a ſtair of the wall, and then have a ſquare half-pace, from which you immediately aſcend to another half-pace, from which the ſtairs fly directly back again, parallel to their firſt flight.

Secondly, Winding-ſtairs are ſuch as always wind and never fly: of theſe there is great variety: as, 1. Circular winding ſtairs; of which there are four kinds, *viz.* ſuch as wind about a ſolid newel, the fore-edge of each being in a right line, pointing to the center of a newel; commonly uſed in church-ſteeples and great old houſes: ſuch as wind round an open newel, the fore ſide of each being in a right line, pointing to the center of the newel, as thoſe in the monument of London: ſuch as wind round a ſolid newel, only the fore-ſide of each an arch of a circle, either concave or convex, pointing near to the circumference of the newel, and ſuch as reſemble the laſt in all other reſpects, ſave that they have an open newel. Any of theſe winding-ſtairs take up leſs room than the other kinds. In ſtairs that wind round a ſolid newel, architects make the diameter of the newel either one ſixth, or one fourth, or one third, or three ſevenths, of the diameter of the ſtair caſe, according as that is in bigneſs: if very ſmall, the newel is but one ſixth; and if large, three ſevenths, *&c.* In ſtairs that wind round an open newel, Palladio orders the newel to be one half of the diameter of the ſtair-caſe, though there does not appear any reaſon why the newel here ſhould not be proportioned to the ſtair-caſe, as in the former. As to the number of ſtairs in each revolution, Palladio orders, that if the ſtair-caſe be ſix or ſeven feet diameter, the ſtairs in each revolution to be twelve; if the diameter be eight, the ſtairs to be ſixteen; or if nine or ten, the ſtairs to be twenty; and if eighteen, to be twenty-four. 2. Elliptical winding-ſtairs, whereof there are two kinds, the one winding round a ſolid, the other round an open newel: they are much of the ſame nature with circular ſtairs, excepting that in the one the newel is a circle, and in the other an ellipſis. 3. Square winding-ſtairs are ſuch as wind round a ſquare newel, either ſolid or open, the fore ſide of each ſtair being a right line pointing to the center of the newel. 4. Triangular winding ſtairs are ſuch as wind round a triangular newel, the fore ſide of each being a right line pointing to the center of the newel. 5. Columniated winding ſtairs. Palladio mentions a ſtair-caſe in Pompey's portico, at Rome, ſet on columns, ſo as the light they receive from above may diſtribute itſelf to all parts alike. 6. Double winding-ſtairs. Scamozzi mentions a ſtair-caſe in this form made by Piedro del Bergo and Jean Coſſin, at Sciamburg, in France, in the king's palace. It is ſo contrived, that the one aſcending and the other deſcending, ſhall never meet. Dr. Grew deſcribes a model of this kind of ſtair-caſe kept in the Muſæum of the royal ſociety. The foot of one of the ſtair-caſes, he ſays, is oppoſite to that of the other, and both make a parallel aſcent, and within the ſame cylinder: the newel in the middle is hollow, and built with long apertures, to convey light from candles placed at bottom, and at the ſides of the newel, in both caſes. 7. Quadruple winding-ſtairs. Palladio mentions a ſtair-caſe of this form in the caſtle of Chambor, near Blois. It conſiſts of four ſtair-caſes, carried up together, having each its ſeveral entrance, and going up one over another in ſuch a manner as that being in the middle of the building, the four ſerve to lead to four apartments, ſo that the people of the one need not go up and down the ſtairs of the other; yet being open in the middle, they all ſee each other paſs.

Thirdly, mixed ſtairs are ſuch as partly fly and partly wind; whence ſome call them fliers and winders. Of theſe there are ſeveral kinds: as, 1. Dog-legged-ſtairs, which firſt fly directly forwards, then wind a ſemi-circle, and then fly directly backwards parallel to that. 2. Square-fliers and winders have a ſquare newel, either ſolid or open, and fly by the ſides of the newel, winding a quadrant of a circle at each corner. 3. Solid and open newelled fliers and winders are of two kinds: the one winds the quadrant of a circle about a ſolid newel, then flies by the ſide of a ſquare open newel, then winds again by the ſide of a ſolid newel, then flies again as before, and ſo alternately. The other flies firſt, then winds, then flies again, alternately.

The dimenſions of ſtairs are differently aſſigned by different authors; but however they agree in this, that they muſt not be more than ſix, nor leſs than four inches high; nor more than eighteen, nor leſs than twelve inches broad; nor more than ſixteen, nor leſs than ſix feet long,

long, each ftair. But thefe meafures regard only large and fumptuous buildings; for in common and ordinary houfes they may be fomething higher and narrower, and much fhorter; yet even in thefe the ftairs are not to exceed feven, or at moft eight inches in heighth, nor be lefs than nine or ten inches in breadth, nor three feet in length. To reduce the dimenfions of ftairs to fome natural, or at leaft geometrical ftandard, Vitruvius borrows the proportion of the fides of a rectangled triangle, which the antient fchool expreffed by the numbers 3, 4, and 5; the firft for the perpendicular height, from the ftair-head to the ground; the fecond for the horizontal breadth; and the third for the whole flope, or inclination, from the edge of one ftair to that of another. But this rule is laid afide, and with good reafon by the modern builders; for on this principle, the lower the ftairs, the narrower they muft be; and ftairs, for inftance, four inches high, fuch as we find mentioned by antient architects, muft be but five inches and one third broad.

One rule to be regarded in the making of ftairs, is, that they be laid fomewhat floping, or a little higher behind, that the foot may, as it were, both afcend and defcend at the fame time; which, though it is obferved by few, is found a fecret and delicate deception of the pains in mounting.

STAKE, the name of a fmall anvil, ufed by fmiths; fometimes it ftands on a broad iron-foot on the work-bench, to be moved up and down occafionally; and fometimes it hath a ftrong iron-fpike at the bottom, by which it is fixed to fome place on the work bench. Its ufe is to fet fmall and cold work ftraight, by hammering it on the ftake; or to cut or punch upon the cold chiffel or cold punch.

STALACTITÆ, or STALACTAGNIA, STONY ICICLES, in natural hiftory, cryftalline fpars formed into oblong, conical, round, or irregular bodies, compofed of various crufts, and ufually found hanging in form of icicles from the roofs of grottos, *&c.* See SPAR.

Of this clafs there are various fpecies, as the hard, white ftalactitæ; the white, fhattery ftalactitæ; and the yellow, fhattery, cryftalline ftalactitæ, *&c.*

STALACTOCIBDELA, in natural hiftory, the name of a genus of fpars, formed by the dropping of water from the roofs of fubterranean caverns; being the coarfer kinds of what authors have called ftalactitæ. Thefe are cryftallino-terrene fpars, formed into oblong bodies, and found hanging from the roofs of caverns and grottos. See SPAR.

Of this genus there are only two known fpecies. 1. A brownifh, friable one, common in our fubterranean caverns, and even on the infides of new-built ftone-arches as thofe of the new bridge at Weftminfter. And, 2. A fnow-white, friable one, found in fubterranean caverns in England and Germany, and even on modern built brick-arches, as has of late been found on opening the vault under the terrace at Windfor. This, and the preceding inftance, give us unqueftionable evidence of the prefent, and daily formation of thefe bodies.

STALAGMITÆ. See the article STALAGMOSCIERIA.

STALAGMODIAUGIA, in natural hiftory, the name of a genus of fpars, being the purer kinds of what authors call ftalagmitæ, or drop ftones. See SPAR.

Thefe are fpars found in form of fmall balls, each compofed of numerous crufts, and confiderably pellucid and cryftalline. Of this genus there are three known fpecies. 1. A white one, with numerous, thin crufts, and a fmooth furface, found in many parts of Germany, and in England. 2. A greyifh, white one, with thicker crufts, and a rougher furface. And, 3. A yellow, thin-crufted one, with an echinated furface. Thefe are both found in the fubterranean caverns of England, and many other places, and the former of them is the confetti di tivoli of the Italians.

STALAGMOSCIERIA, in natural hiftory, the name of a genus of opake fpars, which have received their form from the dropping of water. See SPAR.

The bodies of this genus are the coarfer kinds of what are called by authors ftalagmitæ, and are fmall round maffes, compofed of numerous, thin crufts, and of an opake and coarfe ftructure. Of this genus we have only two known fpecies. 1. A fmall, brownifh, white one, with a fmooth coat, found in Saxony, and fome parts of England. And 2. A fmall, brownifh, white one, with thin crufts, and a large nucleus. This is found in fmall maffes in Yorkfhire, and is the fubftance of which the famous Ketton-ftone of Rutland is compofed. Scotland affords a vaft variety of the ftalag-

lagmitæ. One cave, about eight miles diftant from Aberdeen, on the fea-fide, has its whole roof crufted over with ftalactitæ, of a foot in length, hanging down like the fringe of a bed. The floor alfo is as deep covered with congeries of ftalagmitæ. The upper coat, both of thefe and the ftalactites, is of a fea-colour, but the inner parts are as white as fal prunellæ. The water, which drops from thefe, is of a very peculiar nature; for it is fo acrimonious, that if it touch the fkin but ever fo flightly, it makes it fmart. Near this cave there is another hollow rock, in which the ftalactitæ make a very beautiful figure: they are all formed into long and thick columns, and ftand perpendicularly, fo that they reprefent the pipes of an organ; when broken, they are all found to be hollow within. The rock, and all the ftone thereabouts, is of the lime-ftone kind.

STALBRIDGE, a market-town of Dorfetfhire, fituated eighteen miles north of Dorchefter.

STALE, among fportfmen, a living fowl put in a place to allure and bring others where they may be taken. For want of thefe, a bird fhot, his entrails taken out, and dried in an oven in his feathers, with a ftick thruft through to keep it in a convenient pofture, may ferve as well as a live one.

Stale is alfo a name for the urine of cattle. See the article URINE.

STALIMENE, an ifland in the Archipelago, or Egean-fea.

STALK, in botany, that part of a plant which rifes immediately from the root, and which fupports the leaves of the flowers and the fruit.

The term ftalk is ufed on all occafions; but in fpeaking of the graffes and gramineous plants, the word culm is ufed in its place, to diftinguifh that peculiar kind of ftalk, which is general to all thefe plants, and is not found in any others.

STALKING, a term ufed in fowling, and applied to a kind of fcreen, or device, to hide the fowler and amufe the game, while he gets within fhot. Of fuch devices there are feveral kinds, *viz.* the ftalking-hedge, being an artificial hedge two or three yards long, and about a yard and a half high, made with fmall wands, to be light, and portable, yet bufhed out, like a real hedge, with ftakes, to fupport it, while the fowler takes his aim. Stalking-horfe is an old horfe trained up for the purpofe, which will gently walk up and down, as you would have him, in water, *&c.* beneath whofe fore-fhoulder the fportfman fhelters himfelf and gun. When thus got within fhot he takes aim from before the fore-part of the horfe, which is much better than fhooting under his belly. For change, when the fowls become fo ufed to the ftalking-horfe as to know it, fome ftalk with an ox, cow, deer, or the like: others ufe a ftalking-tree, and others a ftalking-bufh.

STALLION, or STONE-HORSE, in the manege, an ungelt horfe, defigned for the covering of mares, in order to propagate the fpecies. See MARE.

In the choice of ftallions for mares, care fhould be taken that they have no natural blemifh of any kind whatever, fuch as moon-eyes, watery eyes, fplint, fpavins, curbs, *&c.* becaufe, in that cafe, the colts will have the defect hereditary from the parent. On the other hand, the ftallion fhould be chofe able, high-fpirited, fair-coloured, and fine-fhaped. As to his age, he fhould not be younger to cover a mare than four years, nor older than twenty. Let the ftallion be fo highly fed as to be full of luft and vigour: and being brought to the place where the mares are, take off his hinder fhoes, and let him cover a mare in hand twice or thrice, to keep him fober; then pull off his bridle and turn him loofe to the reft of the mares, which fhould be in a convenient clofe, with ftrong fences and good food, and there leave him till he has covered them all, fo that they will bear him no longer; by which time his courage will be pretty well cooled. Ten or twelve mares are enough for one ftallion, in one and the fame year. It will be neceffary to leave a little fhade, or hovel, for him in the field, to which he may retreat from the rain, wind, or fun. In this fhade there fhould be a rack and manger, to feed him during his covering time. After he has done with the mares he fhould be removed to frefh pafture. For the further ordering of a ftallion, before he is to cover, the following inftructions are of ufe. Feed him for three or four months before covering, with good oats, peafe, or beans, or with coarfe bread and a little hays, but a good deal of wheat-ftraw; carrying him twice a-day to water; walking him up and down, for an hour, before he has drank, but without making him fweat.



STAMFORD,

STAMFORD, a borough-town of Lincolnshire, situated thirty-five miles south of Lincoln.

It sends two members to parliament.

STAMINA, according to most botanists, are the male organs of generation in flowers, consisting of two parts, a filament and antheca, though sometimes the anthera stands alone. See the articles ANTHERÆ and FILAMENTS.

Mr. Tournefort takes the use of the stamina to be as it were so many excretory canals for discharging the growing embryo of its redundant juices; and of these excrements of the fruit, he takes that farina, or dust, found in the apices, to be formed. But other writers, as Geoffroy, and Linnæus in particular, assign the stamina a nobler use: these authors, explaining the generation of plants, in a manner analogous to that of animals, maintain the use of the stamina to be that of secreting, in their fine capillary canals, a juice, which being collected, hardened, and formed into a farina, or dust, in the tips of the apices, is thence, when the plant arrives at maturity, discharged by the bursting of the apices upon the top of the pistil, whence is a passage for it to descend into the uterus, where being received, it impregnates and fecundifies the plant. See the articles BOTANY, GENERATION *of plants*, FARINA, FOECUNDANS, and PISTIL.

On this principle it may be said, that the same flower contains both sexes, which contribute each their part to the generation; that the stamina are the male part, and the farina, which is always found of an oily glutinous nature, the seminal liquor; and that the pistil is the female part, which conducts the semen to the ova or embryos. Among the writers of the present age, who oppose this doctrine, is Dr. Alston, professor of botany at Edinburgh, who, in an express dissertation on the sexes of plants, published in the Physical Essays, undertakes to overthrow all the arguments in favour of the sexes of plants, by repeated experiments. This learned author, considering that there are several species of vegetables which bear flowers on one plant and seeds on another, as spinacia mercurialis, cannabis, &c. in order to determine the controversy, thought of training up one or more of these seed-bearing plants at a sufficient distance from those that carry flowers, and observing the consequence. To this end, in spring 1737, he transplanted three sets of the common spinage, long before it could be known whether they were flowering or seed-bearing plants, from a little bed, on which it was raised, into a place of the garden full eighty yards distant, and almost directly south, there being two hawthorn and three holy-hedges, all pretty thick and tall, between them and their seed-bed, and no other spinage in the garden, nor so near them by far; all the three, we are told, proved fertile plants, and ripened plenty of seeds; and further, they were sown, grew, and prospered as well as any spinage could do.

The same author, in spring 1741, made other separate experiments on the common hemp, and the french mercury; each of which plants, notwithstanding they were planted in a very high inclosure, many hundred yards distant from any other of the same class of plants, he assures us, ripened fertile seeds.

For the arguments and experiments of the sexualistæ, or those who established the classes of plants upon the differences of the sexes and parts of fructification in plants, see the article GENERATION.

STAMINA, in the animal body, are defined to be these simple original parts, which existed first in the embryo, or even in the seed; and by whose distinction, augmentation, and accretion, by additional juices, the animal body, at its utmost bulk, is supposed to be formed. See GENERATION.

STAMINEOUS, in botany, a term used by authors, for those flowers of plants which have no petals, or flower leaves, but consist only of a number of stamina and pistils, placed in a cup. This cup is sometimes mistaken for a flower, and its leaves thought to be true petals, but they remain when the stamina are fallen, and become the capsules, containing the seed; which, according to Tournefort, is the true character of a cup, not of a flower.

STAMP-DUTIES, certain impositions laid on all parchment and paper, on which deeds, grants, or other instruments, or any process in law or equity, are ingrossed or written. These duties when first granted were from forty shillings for letters patent, &c. to six pence for the usual deeds; and one penny for declarations, pleadings, &c. They have been, in general, doubled and trebled, by subsequent statutes; and the common stamp now is the treble six-penny. Persons writing or engrossing any thing charged with the duty on parchment or paper, before it is stamped, or if it be marked with

with any lower duty than what is requir-ed, are liable to forfeit 5 l. and the deed ſhall not be deemed good in law, till ſuch penalty is paid, and the ſame be ſtamped, *&c.*

The ſtamp-duties are alſo extended to almanacs, news-papers, pamphlets, cards, and dice. Almanacs printed on one ſide of a ſheet, muſt be on a penny-ſtamp; and the firſt ſheet of book-almanacs on a two penny-ſtamp, under a penalty of 10 l. News-papers printed on a half-ſheet, are charged with ½ d. ſtamp; or if upon a whole ſheet, 1 d. All pamphlets above a ſheet, and under ſix ſheets in octavo, twelve in quarto, or twenty in folio, are ſubject to a ſtamp-duty of 2 s. per ſheet, which is to be paid within ſix days, if printed within the bills of mortality, or within fourteen days if printed at a greater diſtance, on penalty of 20 l. and the loſs of the property of the copy. But the votes of the houſe of commons, public prayers or thankſgivings, printed by authority, and ſermons, are exempted. Cards pay a duty of 6 d. each pack: and the penalty for expoſing cards to ſale, not having one card ſtamp-ed, is 5 l. or not incloſed in paper and thread, ſealed and ſtamped 10 l. Dice pays 5 s. a pair ſtamp-duty; the perſon expoſing unſtamped dice to ſale, forfeits 5 l. for each dice: and whoever files, ſquares, or new-ſpots dice that have been played with, forfeits 10 l.

STAMPS, in metallurgy, a ſort of large peſtles, lifted up by water-wheels, and ſerving to beat to powder the ores, and the refuſe of ores, of metals. This en-gine is called the ſtamping-mill, and ſometimes the knocking mill. See MILL.

STAMPALIA, an iſland of the Archi-pelago, about fifty miles in circumfe-rence, ſituated in eaſt long. 26° 30′, and north lat. 36° 20′.

STANCHEON. See PUNCHEON.

STANCHION, or STANCHIONS, in a ſhip, thoſe pillars, which being ſet up pillar-wiſe, do ſupport and ſtrengthen the waſte-trees.

STAND, in commerce, a weight, from two hundred and a half to three hundred, of pitch.

*Stable* STAND. See STABLE-STAND.

STANDARD, in war, a ſort of banner, or flag, borne as a ſignal for the joining together of the ſeveral troops belonging to the ſame body. See FLAG, *&c.*

The ſtandard is uſually a piece of ſilk, a foot and a half ſquare, on which are embroidered the arms, device, or cypher, of the prince, or of the colonel: it is fix-ed on a lance, eight or nine feet long, and is carried in the center of the firſt rank of a ſquadron of horſe.

The ſtandard is uſed for any martial en-ſign of horſe, but more particularly for that of the general, or the royal ſtandard: thoſe borne by the foot are rather called colours.

STANDARD, in commerce, the original of a weight, meaſure, or coin, committed to the keeping of a magiſtrate, or depo-ſited in ſome public place, to regulate, adjuſt, and try the weights uſed by par-ticular perſons in traffic. See the articles COIN, MEASURE, *&c.*

The juſtneſs of weights and meaſures is of that importance to the ſecurity and good order of trade, that there is no ci-vilized nation, but makes it a part of their policy, to preſerve the equality there-of, by means of ſtandards. The ſtandards of weights and meaſures in England are appointed by magna charta to be kept in the exchequer, by a ſpecial officer, called the clerk or comptroller of the market. See the article CLERK *of the market.*

The ſtandard of gold-coin is twenty-two carats of fine gold and two carats of al-loy in the pound weight troy: and the french, ſpaniſh, and flemiſh gold are nearly of the ſame fineneſs. The pound weight is cut into forty-four parts and a half, each current for twenty one ſhillings. The ſtandard of ſilver is eleven ounces and two penny-weights of ſilver, and eighteen penny-weights of alloy of cop-per. Whether gold or ſilver be above or below ſtandard, is found by aſſaying, and the hydroſtatical balance. See the articles ASSAYING and HYDROSTATI-CAL BALLANCE.

STANDARDS, or STANDELS, in huſbandry, are young trees, reſerved at the felling of woods, for the growth of timber.

STANDING, in the ſea-language. Stand-ing part of the ſheet, is that part of it which is made faſt to a ring at the ſhip's quarter. Standing part of a tackle, is the end of the rope where the block is faſtened. Standing ropes, are thoſe which do not run in any block, but are ſet taught or let ſlack, as occaſion ſerves; as the ſheet-ſtays, back-ſtays, or the like.

STANDON, a town of Hertfordſhire, ſi-tuated under the meridian of London, and ſeven miles north of Hertford.

STANHOPE, a market-town of Durham, ſituated ſixteen miles weſt of Durham.

STANLEY,

STANLEY, a town of Glocefterfhire, fituated twelve miles fouth of Glocefter.

STANNARIES, the mines and works where tin is dug and purified, as in Cornwal, Devonfhire, &c. There are four courts of the ftannaries in Devonfhire, and as many in Cornwal, and great liberties were granted them by feveral acts of parliament, in the time of Edward I. &c. though fomewhat abridged under Edward III. and Charles I.

STANNUM, TIN, in foffil hiftory, fee the article TIN.

STANTON, a town of Lincolnfhire, fituated feventeen miles eaft of Lincoln, under the meridian of London.

STANTS, a town of Switzerland, capital of the canton of Underwald, fituated on the lake of Lucern, twenty-five miles fouth of Zurich.

STANZA, in poetry, a certain ftated number of verfes, generally containing a perfect fenfe, that ought to end with fome lively and ingenious thought, or juft and pertinent reflection.

The word is italian, and literally fignifies a ftand, or ftation, becaufe of the paufe to be made at the end of each ftanza, or complete fenfe. What the couplet is in fongs, and the ftrophe in odes, the ftanza is in the greater and graver pieces. The Italians, indeed, fcarce write any poems, but they divide them into ftanzas. There are ftanzas of four, fix, eight, ten, and twelve verfes; and fometimes of an uneven number, but thefe laft are fomewhat more difficult to execute, by reafon of the three verfes to one rhyme.

The ufe of ftanzas in tragedy and comedy is condemned by all the beft critics; for though we fpeak verfe on the ftage, it is prefumed we are fpeaking profe. Stanzas fhew a degree of ingenuity on the part of the poet, which has nothing of nature in it on the part of the actor: add to this, that ftanzas are not fit to exprefs but a few of the paffions.

STAPELIA, in botany, a genus of the pentandria digynia clafs of plants, the corolla whereof confifts of a large, plane, fingle petal, quinquifid beyond the middle; the fruit confifts of two oblong fubulated folicles, made up of only one valve, and containing one cell; the feeds are numerous, imbricated, compreffed, and pappofe.

STAPES, in anatomy, one of the officula auditoria, being a little bone fituated in the cavity of the feneftra ovalis: thus called from its refembling a ftirrup. See EAR. The head of this bone is joined to the longer leg of the incus; its bafis ftands in the feneftra ovalis of the labyrinth of the ear; and its two lateral parts have their internal furface furrowed; the head is articulated by arthrodia with the leg of the incus. See the article INCUS.

STAPHYLÆA, BLADDER-NUT, in botany, a genus of the pentandria-trigynia clafs of plants, the corolla of which confifts of five oblong erect petals, of the length of the cup; the fruit is compofed of three inflated flaccid capfules, affixed together longitudinally, by a future, pointed at the tops, and opening on the infides; the feeds are two, offeous, fubglobofe, with oblique points, and an orbicular hole at the fide of the apex.

STAPHYLINUS, in zoology, a genus of infects, the antennæ of which are flender and filiform; there are two veficles, fituated above the tail; the exterior wings are demidiated and fhort, the interior ones are covered by them.

STAPHYLOMA, in furgery, the name of a diftemperature of the eye, which is of two kinds: in one the cornea is more than ufually protuberant; and in the other, the uvea breaks forth, and forms an unfightly tumour on the cornea, either from internal caufes, or from fome wounding inftrument forced through the coat; in which laft cafe, the fight of the eye is ufually deftroyed. This is a very dangerous diforder, as it not only deforms the face, and deftroys the fight of the eye, but very often it induces violent inflammations, head-achs, reftlefnefs, abfceffes, and fometimes a cancer in thofe parts. In the cure of this diforder, the tumour and deformity are to be relieved, according to Heifter, by the application of compreffes dipped in alum-water, together with a plate of lead and a bandage, or fome proper inftrument. If the uvea protrudes itfelf thro' a wound in the cornea, it fhould be returned with a probe: the patient muft be ordered to lie in a fupine pofture; and the wound muft conftantly be dreffed with the white of an egg, and a mucilage of quince-feeds, till it is healed; by this means the fight is often reftored.

If this diforder is become inveterate and inflexible to all remedies, a needle, armed with a double thread, muft be paffed through the middle of the tumour, and the two ends of the thread are then to be tied on a knot, firft on one fide, and then

on the other, by which means the tumour will gradually wither, and fall off along with the threads; but as this method occasions a continued pain, and from thence sometimes arise inflammations, it is better ſtill to cut off the tumour with a ſcalpel, or ſciſſors.

STAPLE primarily ſignifies a public place or market, whither merchants, *&c.* are obliged to bring their goods to be bought by the people, as the Greve, or the places along the Seine, for ſale of wines and corn, at Paris, whether the merchants of other parts are obliged to bring thoſe commodities.

Formerly the merchants of England were obliged to carry their wool, cloth, lead, and other like ſtaple-commodities of this realm, in order to utter the ſame by wholeſale; and theſe ſtaples were appointed to be conſtantly kept at York, Lincoln, Newcaſtle upon Tyne, Norwich, Weſtminſter, Canterbury, Chicheſter, Wincheſter, Exeter, and Briſtol; in each whereof a public mart was appointed to be kept, and each of them had a court of the mayor of the ſtaple, for deciding differences, held according to the law-merchant, in a ſummary way.

The ſtaple-commodities of this kingdom are ſaid by ſome to be theſe, *viz.* wool, leather, wool-fells, lead, tin, butter, cheeſe, cloth, *&c.* but others allow only the firſt five to be ſtaple-commodities.

Staple ſignifies alſo a city or town, where the merchants jointly agree to carry certain commodities. The principal ſtaples at preſent are Amſterdam, for all goods from the Eaſt-indies, Spain, the Mediterranean, and the Baltic; Fluſhing, for thoſe of the Weſt-indies; Middleburgh, for french wines; Dort, for rheniſh wines and engliſh cloth; Verre, in Zealand, for ſcotch merchandizes, *&c.* The ſtaples in the Levant, are ſuch cities where the Engliſh, French, Dutch, Italians, *&c.* have conſuls, factors, and magazines; and whither they ſend veſſels regularly every year. See FACTORY, FAIR, *&c.*

STAR, *ſtella*, in aſtronomy, a general name for all the heavenly bodies, which, like ſo many brilliant ſtuds, are diſperſed throughout the whole heavens.

The ſtars are diſtinguiſhed, from the phænomena of their motion, *&c.* into fixed, and erratic or wandering ſtars: theſe laſt are again diſtinguiſhed into the greater luminaries, *viz.* the ſun and moon; the planets, or wandering ſtars, properly ſo called; and the comets; each whereof has been fully conſidered and explained under their reſpective articles SUN, MOON, PLANET, and COMET.

As to the fixed ſtars, or ſimply ſtars, they are ſo called becauſe they ſeem to be fixed, or perfectly at reſt, and conſequently appear always at the ſame diſtance from each other.

*Diſtribution and number of the fixed* STARS. An obſerver will firſt divide theſe ſtars into ſeveral claſſes, according to the ſplendor of their light; the brighteſt he will call ſtars of the firſt magnitude; thoſe of the next inferior light, he will call ſtars of the ſecond magnitude; and ſo in order to thoſe which can barely be ſeen by the naked eye, which are called ſtars of the ſixth magnitude: and thoſe which cannot be ſeen but by the help of magnifying glaſſes, are of the ſeventh, eighth, *&c.* magnitudes. Afterwards, to avoid confuſion, and to be able to point out any one ſtar, without being obliged to give a particular name to each, he will divide them into ſeparate parcels, of which he will make a particular plan; and to each of theſe conſtellations, or parcels of ſtars, he will aſſign a figure at pleaſure, as that of a ram, a bull, a dragon, a Hercules, *&c.* but ſo that all the ſtars in each of the parcels, drawn in the plan, may be encloſed in the deſigned figures, and correſpond to the different parts from whence they take their name: for example, having drawn the figure of a bull about a parcel, or conſtellation, of ſtars, that ſtar which falls in the eye will be called the ſtar in the bull's eye, or ſimply, the bull's eye; another, which reſpects the tip of one horn, will be named the bull's horn; and ſo of others. A parcel of ſtars thus contained in any aſſigned figure, is called a conſtellation. See CONSTELLATION.

By this means notwithſtanding the ſeeming impoſſibility of numbering the fixed ſtars, their relative ſituations one to another have been ſo carefully obſerved by aſtronomers, that they have not only been able to number them, but even to diſtinguiſh the place of each ſtar in the heavens, and that with greater accuracy than any geographer could ever point out the ſituations of the ſeveral cities or towns upon the ſurface of the earth; and not only the places of thoſe few, if they may be ſo called, which are to be ſeen with the naked eye, have been pointed out and regiſtered by them, but even of thoſe which are diſcovered only by the teleſcope. The moſt antient obſervations of the ſtars, which

which have reached these times, were made by Timocharis and Ariſtillus, about 300 years before Chriſt. The next after them, who made a catalogue of the ſtars viſible to the naked eye, and regiſtered their places, was Hipparchus of Rhodes; he flouriſhed about 120 years before Chriſt, and numbered 1022 ſtars. After him, Ptolemy enlarged his catalogue to 1026: Ulug Beigh, the grand-father of Tamerlane the great, about the year 1437, conſtructed a new catalogue, more exact than that of Ptolemy, containing 1017 ſtars: Tycho, in the year 1600, determined the places of 777 fixed ſtars, and reduced them to a catalogue: Kepler's catalogue contained 1163 ſtars; and that of the prince of Heſſe, 400: Ricciolus enlarged Kepler's catalogue to 1468; and John Bayer, a German, had deſcribed the places of 1725 ſtars: after this, about 1670, Hevelius of Dantzick, compoſed a catalogue of 1888 fixed ſtars: Dr. Halley alſo undertook a voyage to the iſland of St. Helena, in order to take the poſition of the ſtars within the antarctic circle, of which he publiſhed a catalogue, containing 373 ſtars: but the largeſt and moſt complete catalogue ever yet publiſhed, is that of our accurate aſtronomer Mr. Flamſteed, in his Celeſtial Hiſtory, which contains near 3000 ſtars; all whoſe places are more exactly determined in the heavens, than the poſition of cities and other places on the earth.

We ought not, however, to imagine, that all the fixed ſtars are thus numbered, and reduced to their reſpective places in the heavens; ſince their number continually increaſes, according to the goodneſs of the teleſcope, appearing millions beyond millions, till, by their immenſe diſtance, they evade the ſight, even tho' aſſiſted by the beſt inſtruments. The teleſcopical ſtars with which Mr. Flamſteed has enriched his catalogue, are only the more remarkable ones, whoſe longitudes and latitudes, or ſituations in the heavens, it was thought worth while to regiſter and put down. Dr. Hook, with a teleſcope of twelve feet, ſaw 78 ſtars among the pleiades; and with a longer teleſcope, ſtill more: and, in the ſingle conſtellation of orion, which in Mr. Flamſteed's catalogue, has but 80 ſtars, there have been ſeen 2000. We may, therefore, venture to pronounce the number of fixed ſtars, including the teleſcopic ones as well as thoſe viſible to the naked eye, to be infinitely great, far beyond what it is poſſible for the beſt aſtronomers to calculate, much leſs to reduce to order. But though the ſtars are certainly innumerable, yet thoſe viſible to the naked eye, in one hemiſphere, ſeldom exceed a thouſand; which, perhaps, may appear ſtrange, ſince, at firſt ſight, their number ſeems immenſely great; but this is only a deception of ſight, ariſing from a confuſed and tranſient view; for let a perſon ſingle out a ſmall portion of the heavens, and after ſome attention to the ſituation of the more remarkable ſtars therein, begin to count, he will ſoon be ſurpriſed to find how few there are therein. However, even the number of ſtars viſible to the naked eye, ſmall as it is in compariſon with that of the teleſcopic ones, is far from being conſtant; ſince, beſides that the different ſtates of the atmoſphere renders many of the leſſer ſtars inviſible, ſome ſtars have been obſerved to appear and diſappear by turns; particularly one in the chair Caſſiopeia, in the year 1572, which, for ſome time, outſhone the biggeſt of the fixed ſtars, and in ſixteen months time, by degrees, vaniſhed quite away, and was never ſeen ſince: in the year 1640, the ſcholars of Kepler ſaw a ſtar in the right leg of ſerpentarius, which likewiſe gradually diſappeared: Fabricius, in the year 1596, gives the firſt account of the ſtella mira, or wonderful ſtar, in the neck of the whale; which has been ſince found to appear and diſappear periodically, its period being ſeven revolutions in ſix years, but is never quite extinguiſhed. Several other new ſtars have been obſerved: as one by Hevelius, in 1670, and another by Mr. Kirch, in 1689. Theſe new ſtars are generally obſerved in the galaxy, or milky way, See the article GALAXY.

As to the cauſes of this appearing and diſappearing of the fixed ſtars, Sir Iſaac Newton conjectures, that as it is poſſible our ſun may ſometimes receive an addition of fuel by the falling of a comet into it; ſo the ſudden appearance of ſome ſtars, which formerly were not viſible to us, may be owing to the falling of a comet upon them, and occaſioning an uncommon blaze and ſplendor for ſome time: but that ſuch as appear and diſappear periodically, and increaſe by very ſlow degrees, ſeldom exceeding the ſtars of the third magnitude, may be ſuch as having large portions of their ſurfaces obſcured by ſpots, may, by revolving

round

round their axis, like the fun, expofe their lighter and darker parts to us fucceffively.

*Nature and diftance of the fixed* STARS. From the fimilitude there appears to be between them and the fun, it is generally fuppofed by philofophers, that they are not placed in the heavens by way of ornament only, or to fupply us with a faint light in the abfence of the moon; but that each of them is placed in the midft of a fyftem of planetary worlds, and that it directs their motions, and fupplies them with light and heat, in the fame manner that the fun does the feveral bodies of which our folar fyftem is compofed; in fhort, that they are fo many funs, which no doubt have planets moving regularly round them, though invifible to us. That this is not mere hypothefis, will appear from the following arguments, drawn from the analogy they bear to our fun: the fun fhines by its own native light, and fo do the fixed ftars: the fun, at the diftance of the fixed ftars, would appear no larger than a ftar; none of our planets, at that diftance, could be feen at all: is it not probable, therefore, that each of the fixed ftars is a fixed fun, furrounded by a fyftem of planets and comets, which may be again furnifhed with different numbers of fatellites, or moons, though invifible to us? Befides, as the number of ftars is immenfely great, difperfed through fpaces of the univerfe, far beyond the reach of the beft telefcopes, and as God has made nothing in vain, it feems highly probable that they feverally ferve the purpofes of light and heat for the planets of their fyftems; fince nothing can be more abfurd than to pretend that myriads of unfeen ftars were made to twinkle in the unknown regions of the univerfe.

That the fixed ftars fhine by their own light, is thus proved: when viewed thro' a telefcope, they appear only as mere lucid points, deftitute of all fenfible magnitude, and confequently muft be at a vaft diftance; becaufe the fatellites of jupiter and faturn, when viewed through a telefcope, appear of very diftinguifhable magnitudes, and yet are invifible to the naked eye. Since, then, the fixed ftars are at fuch a vaft diftance, that the beft telefcope has no power to magnify them, and neverthelefs fhine with a very bright and fparkling light, it is inferred that they muft fhine with their own proper and unborrowed light; becaufe, if their light was only borrowed, they would, like the fatellites already mentioned, be invifible to the naked eye.

The celebrated Huygens found the brighteft and largeft, and confequently the neareft of the fixed ftars, *viz.* firius, or the dog-ftar, to be in appearance 27664 times lefs than the fun; and fince the diftances of objects are greater as their apparent magnitudes are leffer, the dog-ftar muft be diftant from our earth 2000000000000, or above two millions of millions of englifh miles; which is fo very great, that a cannon-ball continuing in the fame velocity it acquires when immediately difcharged at the mouth of the cannon, would fpend almoft feven hundred thoufand years in paffing thro' it: and it is very probable, that the fixed ftars are equally diftant from each other, as the neareft of them is from our fun; fince, the better the telefcopes we make ufe of, the more ftars are feen. Hence it is very natural to conclude, that all the fixed ftars are not placed at equal diftances from us: but that they are every where interfperfed, at great diftances beyond one another, throughout the univerfe; and that, probably, the different appearances which they make, in point of fplendor and magnitude, may be rather owing to their various diftances from us, than to any real difference in their magnitudes.

From what has been faid, concerning the number, nature, and diftance of the fixed ftars, the hypothefis of a plurality of worlds, wherein each fixed ftar ferves as a fun to a fyftem of planets, feems rational, worthy a philofopher, and greatly difplays the wifdom, and redounds to the glory of the great creator and governor of the univerfe.

*Apparent motions of the fixed* STARS. Since the fixed ftars remain immoveable, whatever is faid of their motions, muft be underftood of their apparent motions only; and of thefe aftronomers reckon four kinds.

I. The firft, and indeed the moft obvious, apparent motion of the ftars, is that from eaft to weft; which, being entirely owing to the diurnal rotation of the earth round its axis, has been already explained under the articles EARTH and DIURNAL.

II. The fecond apparent motion of the fixed ftars, arifing from the preceffion of the equinoxes, is very fmall, not exceeding 50″ in a year, or 1° in 70 years; and, therefore, to complete one revolution of a circle, it requires no lefs than



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25920 years, after which period the ſtars all return to their former places: this motion has alſo been accounted for, under PRECESSION and PLATONIC YEAR.

III. The third apparent motion of the ſtars, is owing to what is called the aberration of light; the diſcovery of which we owe to our excellent aſtronomer Dr. Bradley, who, being deſirous to diſcover the parallax of the earth's annual orbit, cauſed an inſtrument to be made by the late accurate Mr. Graham; and found, by many obſervations, that the bright ſtar, ♈, in the head of the conſtellation draco, appeared 39″ more northerly in September than in March; juſt the reverſe of what it ought to appear, by the annual parallax of the ſtars. This unexpected phænomenon perplexed the Doctor and Mr. Molyneux very much; and Mr. Molyneux died before the true cauſe of it was diſcovered. Afterwards, Dr. Bradley, with another inſtrument, more exact, and accurately adapted to this purpoſe, obſerved the ſame appearances, not only in that, but many other ſtars; and being fully ſatiſfied, by many repeated trials; that the phænomenon was neither owing to any error in the inſtrument nor obſervation, applied himſelf to conſider what might be the true cauſe of it; and after many reflections and hypotheſes, which he ſtill found inſufficient, he at laſt diſcovered that it was really owing to the progreſſive motion of light, and the ſenſible proportion which the velocity thereof bore to the velocity of the annual motion of the earth.

This important diſcovery we ſhall now proceed to explain; and firſt, it is a known fact, by the obſervation of jupiter's ſatellites, that the light whereby objects become viſible to us, employs a ſenſible time in coming from the object to the eye, when at a great diſtance from each other; this we have proved under the article LIGHT; where it is ſhewn, that a ray is about 8′ in coming from the ſun to the earth.

It is alſo certain, that the viſibility of objects depends on the impreſſion made on the eye by the luminous rays they tranſmit; alſo the figure and poſition of objects are judged of according to this impreſſion, and therefore thought to be in the right line in whoſe direction they fall upon the eye. Hence, if the rays of light tranſmitted from objects arrive at the eye after having been reflected, refracted, or, by any phyſical accident, turned from the firſt courſe, the objects are however, judged to be in the direction of thoſe rays which enter the eye, and not in that of the rays immediately iſſuing from the object.

Now if the earth had no annual motion, a ray of light paſſing from a ſtar with any finite velocity, and arriving at the eye without being turned off by any phyſical cauſe, would ſhew the ſtar in its true ſituation, whatſoever time that ray might employ in coming from the ſtar to the eye: and the ſame would happen though the earth was moveable, provided the velocity of light was infinite; for then the earth's motion would be inconſiderable, when compared with a velocity infinitely great. But when the velocity of light has a finite proportion to that of the earth, the impreſſion of the ray on the eye is neither in the direction of the ray firſt tranſmitted, nor in that of the earth; but, like a body urged by two forces in different directions, the impreſſion is made in the diagonal of a parallelogram, formed by the directions of the ray, and a tangent to the earth's orbit at the point where the earth is when the ray falls upon it, becauſe the ſides of this parallelogram are proportional to the velocities or ſpaces run through by the earth and ray, in the ſame time. So that the ſtar's apparent place will be at the end of that diagonal, which falls on one ſide of the ſtar's true place.

For example, let T L Q I (plate CCLX. fig. 1.) be an indefinitely great circle repreſenting the ecliptic, with the ſun at its center S; P its pole, C B F D the earth's orbit, Q P E T a circle of latitude paſſing through any ſtar E, determining the longitude in T and latitude in T E. Let T Q be the interſection of the plane of this circle of latitude, with the plane of the ecliptic; and let the earth's place be firſt in C, when the ſtar is in conjunction with the ſun: then having joined C E; and drawn the tangent C *c*, which is perpendicular to the plane of the circle of latitude T P Q; C E is to C *c*, as the velocity of the ray of light is to the velocity of the earth in its orbit. Now it being known, that light is a little more than 8′ of time in paſſing from the ſun to the earth; alſo that the earth deſcribes in its orbit an arc of 20″ in that time, we have R : tang. 20″ : : C E = 8′ 13″ : C *c*. Wherefore

fore C $c$ being thus determined, and the parallelogram E C $c$ $\chi$ constructed, the point $\chi$ is the place in the heavens where the impreffion of the light will occafion the ftar to appear; and the celeftial arc, E $\chi$, is called the ftar's aberration.

From a like conftruction made for every point of the earth's orbit, it follows, 1. That, fuppofing this orbit to be circular, and the velocities of light and the earth uniform, then all the apparent places of the fame ftar muft be in a circle, with the ftar's true place at its center, and whofe plane is parallel to the ecliptic; confequently, the projection of this circle in the heavens is an ellipfis, whofe greater axis is parallel to the plane of the ecliptic, its leffer axis perpendicular to that plane, and are in proportion as the radius to the fine of the ftar's latitude: and according to the niceft obfervations, the greater axis of the ellipfis of aberration fubtends in the heavens an arc of 40″ of a great circle. 2. The plane of a ftar's parallelogram of aberration changes its fituation every inftant; being determined by the ftar, and by the pofition of a tangent to every fucceffive place of the earth in its orbit: it muft therefore make a revolution in a year; and becaufe of the almoft infinite diftance of the ftars from the fun and the earth, the earth's orbit may be taken only as the point S, and the plane of the angle of aberration may be fuppofed to turn in the right line E S, drawn from the ftar to the fun, in the fame manner as the earth moves about the fun. 3. The ftar's apparent motion in this ellipfis, muft differ from that in the epicycle; for when the plane of the parallelogram of aberration is become perpendicular to the plane T P Q of the circle of latitude, which happens in the fyzygy, becaufe the tangent C $c$ is then perpendicular to that plane, the angle of aberration is not in the plane T P Q, nor is there then any aberration in latitude: but this angle is meafured by the right line, E $\chi$, parallel to the ecliptic, and perpendicular to the plane T P Q, being half the greater axis of the ellipfis; and is therefore the arc of a fmall circle, parallel to the ecliptic, and paffing through the ftar's true place; the whole aberration being then in longitude, and at its greateft. But when the plane of the angle of aberration co-incides with the plane T P Q, which happens when the earth has run through 90° from the fyzygy, and confequently where the ftar is in quadrature with the fun, the angle of aberration is wholly in latitude; and the ftar being at the extremity of the leffer axis of its ellipfe, the aberration in latitude is there greateft, and nothing in longitude. In other pofitions of the plane of this angle, the aberration is divided partly in longitude, and partly in latitude, much like a force oblique to a plane; all which is juft the reverfe of what it fhould be, by the parallax of the annual orbit; fince, according to it, the parallax in longitude is greateft in the quadratures, and nothing in the fyzygies; and the parallax in latitude is greateft in the fyzygies, and nothing in the quadratures. Moreover, if a circle of declination, R V X, be conceived to pafs through the ftar E, confequently croffing its ellipfis of aberration by paffing through the center; it is evident, that, when a ftar appears at the points where that circle interfects the ellipfis, it will appear to have no aberration in right afcenfion, becaufe its true and apparent place will be in the fame circle of declination: and when the ftar is in the points where its ellipfis is cut by a diameter perpendicular to the circle R V X, it will have no aberration in declination, becaufe its true and apparent place will be in the fame parallel to the equator. But all circles of declination being oblique to the ecliptic, except the folftitial colure, the ftar does not pafs from the term of no aberration in right afcenfion, to that of no aberration in declination, in the time the earth takes to defcribe 90° of its orbit; confequently, when the aberration is greateft in right afcenfion, it is not abfolutely nothing in declination, and reciprocally.

Laftly, to calculate the effect of the aberration of light on the planets, fay; as the horary motion of the fun multiplied by the radius of the annual orbit of the earth, is to the diftance of the earth from the planet multiplied by 20″; fo is the horary motion of the planet, in longitude, in latitude, in right afcenfion, or in declination, to a quantity whereby the aberration of light has diminifhed this longitude, this latitude, this right afcenfion, or this declination. The demonftration of this analogy may be found in the Memoirs of the Academy of Sciences at Paris, for the year 1746; and thofe who defire

desire farther information on this subject, may consult the said Memoirs for 1737, the Philos. Trans. n° 485, and La Caille's Elem. Astron. §. 177, seq.

IV. The fourth apparent motion of the fixed stars is that arising from the nutation of the earth's axis; a discovery we also owe to doctor Bradley, who observed a greater declination in some of the fixed stars, lying nearly opposite in right ascension, than the precession of the equinoctial points would have occasioned, and such as a nutation or libratory motion of the earth's axis would effect. The quantity of this nutation, as collected from the doctor's observations, is 18″; which is equal to the diameter of the little circle, wherein the pole of the equator moves: but for the application of this theory to the practice of astronomy, in solving the various phænomena of the fixed stars, we must refer to the above-mentioned books; and shall only observe, that the corrections arising from the aberrations of light, as well as from the nutation of the earth's axis, must not be neglected in astronomical observations, since such neglects may produce errors of near a minute in the polar distances of some stars. As to the causes of the nutation of the earth's axis, the doctor thinks some part of it at least, if not the whole, is owing to the moon's action upon the equatorial parts of the earth; which, he conceived, might cause a libratory motion of the earth's axis. But as he was unable to judge, from only nine years observation, whether the axis would entirely recover the same position that it had in the year 1727, he found it necessary to continue his observations through a whole period of the moon's nodes; at the end of which he had the satisfaction to see, that the stars returned into the same positions again, as if there had been no alteration at all in the inclination of the earth's axis: which fully convinced him that he had guessed rightly as to the cause of the phænomenon. This circumstance proves likewise, that if there be a gradual diminution of the obliquity of the ecliptic, it does not arise only from an alteration in the position of the earth's axis, but rather from some change in the plane of the ecliptic itself: because the stars, at the end of the period of the moon's nodes, appeared in the same places, with respect to the equator, as they ought to have done, if the earth's axis had retained the same inclination to an invariable plane.

*Falling* STARS, *stellæ cadentes*, in meteorology, fiery meteors, which dart thro' the sky, in form of a star; being occasioned by a nitro-sulphureous matter, the common cause of all such meteors. See the article AURORA BOREALIS.

STAR, in heraldry, a charge frequently borne on the shield, and the honourable ordinaries, in figure of a star; which differs only from the mullet, in not being pierced as this last is. See MULLET.

STAR is also a badge of honour, worn by the knights of the garter, bath, and thistle. See the article GARTER.

STAR, in pyrotechny, a composition of combustible matters, which, being thrown aloft in the air, exhibits the appearance of a real star.

Stars are chiefly used as appendages to rockets, a number of them being usually inclosed in a conical cap or cover, at the head of the rocket, and carried up with it to its utmost altitude, where the stars, taking fire, are spread around, and exhibit an agreeable spectacle. See the article ROCKET.

To make stars, mix three pounds of saltpetre, eleven ounces of sulphur, one of antimony, and three of gun-powder dust: or twelve ounces of sulphur, six of saltpetre, five and an half of gun-powder dust, four ounces of olibanum, one of mastic, camphire, sublimate of mercury, and half a one of antimony and orpiment. Moisten the mass with gum water, and make it into little balls of the size of a chesnut, which dry either in the sun or the oven. These, set on fire in the air, will represent stars.

STAR-APPLE, *chrysophyllum*, in botany. See the article CHRYSOPHYLLUM.

STAR *of Bethlehem*, *ornithogalum*, in botany. See the article ORNITHOGALUM.

STAR-BOARD, in the sea-language, denotes the right-hand side of a ship: thus they say, star-board the helm, or helm a star-board, when he that conds would have the men at the helm, or steering-wheel, put the helm to the right-side of the ship.

STAR-CHAMBER, a chamber at Westminster, so called from having its roof painted with gilt stars, wherein the chancellor, assisted by others, appointed for that purpose, formerly had authority to punish routs, riots, and other misdemeanors, that were not by the common law

law provided againſt. See the article CHAMBER.

STAR-FISH, *aſterias*, or *ſtella marina*, in zoology, a genus of naked inſects, in the form of a radiated ſtar; the mouth is ſituated in the center, on the under part; and the anus in the center, on the upper part: the tentacula are extremely numerous, and in a manner cover, either the whole upper ſurface of the body, or the extremities of the ramifications.

The ſpecies of this genus, being very numerous, are diſtinguiſhed according to the number of their rays; they are alſo of different ſizes; the largeſt, or great magellanic ſtar-fiſh, forming a circle of three feet in diameter, when its rays are fully extended, others not exceeding an inch in diameter. See plate CCLX. fig. 3. where four of the leſſer ones are repreſented.

STAR-FORT, or REDOUBT, in fortification. See the articles FORT and REDOUBT.

STAR-GAZER, in ichthyology, the engliſh name of the uranoſcopus. See the article URANOSCOPUS.

STAR-SHOT, a gelatinous ſubſtance frequently found in fields, and ſuppoſed by the vulgar, to have been produced from the meteor, called a falling ſtar: but, in reality, is the half digeſted food of herons, ſea-mews, and the like birds; for theſe birds, when ſhot, have been found when dying, to diſgorge a ſubſtance of the ſame kind.

STAR-STONE, *aſteria*, in natural hiſtory, a name given to certain extraneous foſſil ſtones, in form of ſhort, and commonly ſomewhat crooked, columns, compoſed of ſeveral joints; each reſembling the figure of a radiated ſtar, with a greater or ſmaller number of rays in the different ſpecies: they are uſually found of about an inch in length, and of the thickneſs of a gooſe-quill. Some of them have five angles, or rays, and others only four, and in ſome the angles are equi-diſtant, while in others they are irregularly ſo; in ſome alſo they are ſhort and blunt, while in others they are long, narrow, and pointed; and ſome have their angles ſo very ſhort and obtuſe, that at firſt ſight they might be taken for entrochoaſteriæ. The ſeveral joints in the ſame ſpecimen are uſually all of the ſame thickneſs; this however is not always the caſe, but in ſome they are larger at one end, and in others at the middle, than in any other part of the body; and ſome ſpecies have one of th rays bifid, ſo as to emulate the appearance of a ſix-rayed kind. See plate CCLX. fig. 4. where ſeveral ſorts of them are repreſented.

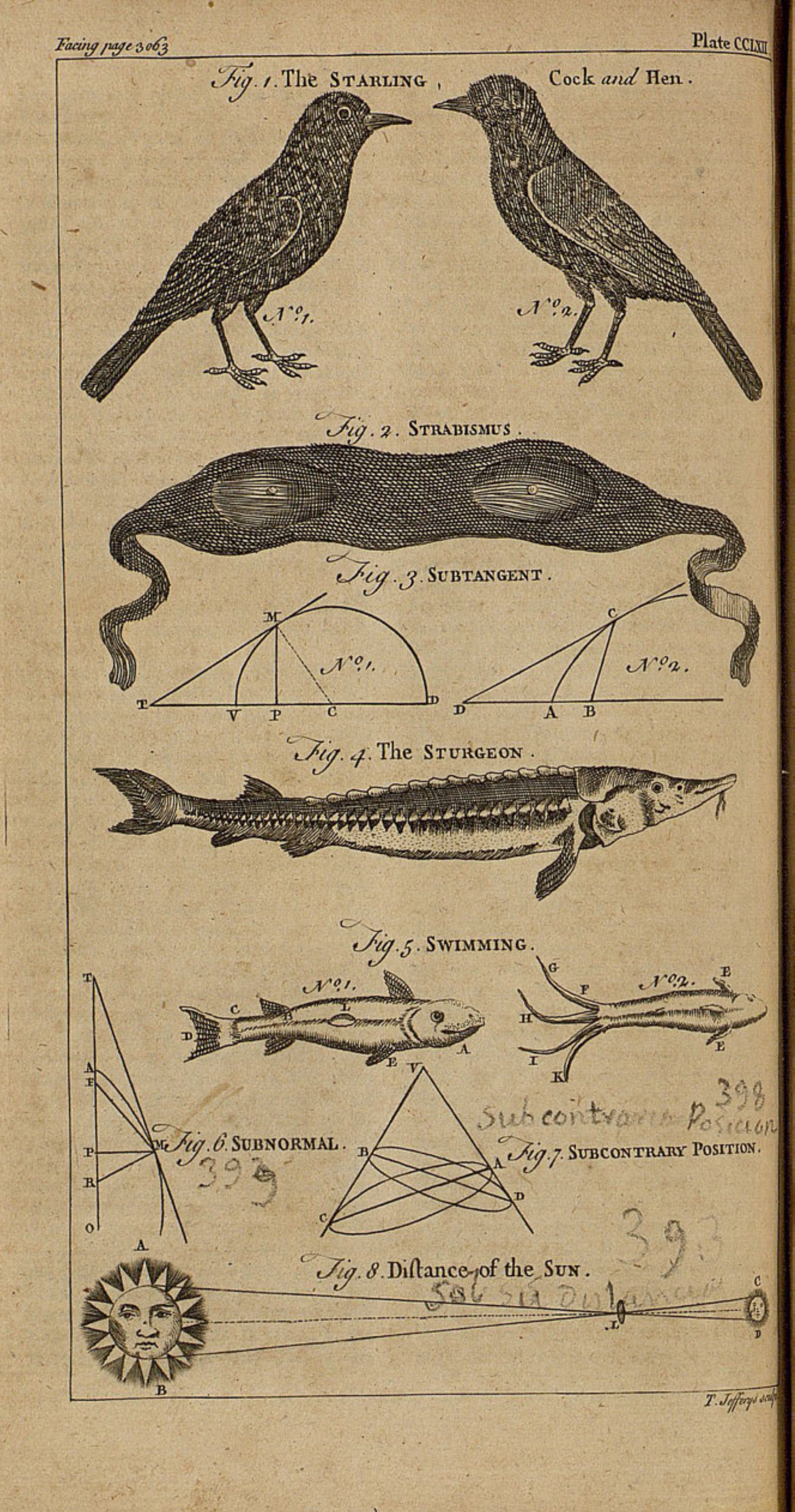
STAR-THISTLE, the engliſh name of a ſpecies of centaurea, called by ſome calcitrapa. See the article CENTAUREA.

STAR-WORT, *aſter*, in botany. See the article ASTER.

STARCH, a fecula, or ſediment, found at the bottom of veſſels wherein wheat has been ſteeped in water, of which fecula, after ſeparating the bran from it, by paſſing it through ſieves, they form a kind of loaves, which being dried in the ſun or an oven, is afterwards cut into little pieces, and ſo ſold. The beſt ſtarch is white, ſoft, and friable, and eaſily broken into powder. Such as require fine ſtarch do not content themſelves, like the ſtarch-men, with refuſe wheat, but uſe the fineſt grain. The proceſs is as follows: The grain being well cleaned is put to ferment in veſſels full of water, which they expoſe to the ſun while in its greateſt heat, changing the water twice a day, for the ſpace of eight or twelve days, according to the ſeaſon. When the grain burſts eaſily under the finger, they judge it ſufficiently fermented. The fermentation perfected, and the grain thus ſoftened, it is put, handful by handful, into a canvas bag, to ſeparate the flour from the huſks, which is done by rubbing and beating it on a plank laid acroſs the mouth of an empty veſſel that is to receive the flour.

As the veſſels are filled with this liquid flour, there is ſeen ſwiming at top rediſh water, which is to be carefully ſcummed off from time to time, and clean water is to be put in its place, which, after ſtirring the whole together, is alſo to be ſtrained through a cloth or ſieve, and what is left behind put into the veſſel with new water, and expoſed to the ſun for ſome time. As the ſediment thickens at the bottom, they drain off the water four or five times, by inclining the veſſel, but without paſſing it through the ſieve. What remains at bottom is the ſtarch, which they cut in pieces to get out, and leave it to dry in the ſun. When dry it is laid up for uſe.

To uſe ſtarch, they take as much as is needed, and ſteep it in water over night, changing the water four or five times. The ſtarchmen uſing the refuſe of wheat, only obſerve a part of theſe things in their


Fig. 1. The STARLING, Cock and Hen.
No. 1.
No. 2.
Fig. 2. STRABISMUS.
Fig. 3. SUBTANGENT.
M
No. 1.
T
V
P
C
D
C
No. 2.
D
A
B
Fig. 4. The STURGEON.
Fig. 5. SWIMMING.
No. 1.
No. 2.
Fig. 6. SUBNORMAL.
Fig. 7. SUBCONTRARY POSITION.
Fig. 8. Distance of the SUN.
T. Jefferys sculp.

their procefs, but their ftarch falls far fhort of this. Starch is ufed along with fmalt, or blue ftone, to ftiffen and clear linen; the powder thereof is alfo ufed to whiten and powder the hair. It is alfo ufed by the dyers to difpofe their ftuffs to take colours the better.

Starch, the hundred weight, pays, on importation, three pounds, fifteen fhillings, and four pence; and foreign ftarch draws back nothing upon exportation. By the 23d. Geo. II. Starch may not be imported in any package that fhall not contain two hundred and twenty-four pounds of neat ftarch, at the leaft, under penalty of forfeiting the goods, and the mafter, or other perfon, taking charge of the veffel, to forfeit fifty pounds.

STARGARD, a town of Germany, in the circle of Upper-Saxony, and dutchy of Pomerania, fituated twenty miles eaft of Stetin.

STARIA, a city of Ruffia, in the province of Great Novogorod, fituated at the fouth end of the Ilmen-lake: eaft long. 34° 20', north lat. 58°.

STARLING, *fturnus*, in ornithology, a diftinct genus of birds of the order of the pafferes, the characters of which are thefe: the beak is of a fubulated figure, and depreffed in an angulated manner, and obtufe at the extremity; the tongue is marginated and acute.

Of this genus there is only one known fpecies, *viz.* the common ftarling, much about the fize of the black-bird, only that it ftands more erect, and the body is flenderer. Its general colour is black, variegated with grey fpots, and the tips of the feathers of the neck and back are yellowifh: the principal feathers of the wings and tail are brown, and have fome yellow at their edges. The ftarling is frequent with us, and may be taught to imitate the human voice. See plate CCLXII. fig. 1. where n° 1. reprefents the cock, and n° 2. the hen.

STARTING, in the manege. A horfe is faid to be ftarting, fkittifh, or timorous, that takes every object he fees to be otherwife than it is; whence he frequently ftops, flies out, and ftarts fuddenly to one fide, infomuch that the rider cannot make him go forwards. This fault is more common to geldings than ftone-horfes, and thefe are moft fubject to it who have bad eyes, as well as thofe that have been kept long in a ftable without airing; but thefe laft are eafily cured of it. You fhould never beat a ftarting horfe in his confternation, but get him to advance gently, and by fair means, to the object that alarms him.

START-POINT, a cape, or promontory, of Devonfhire, in the englifh channel, twelve miles fouth of Dartmouth.

STATE, or ESTATE, an empire, kingdom, province, or extent of country under the fame government. See the article ESTATE.

STATEN-ISLAND, an ifland of the province of New-York, in North America, fituated near the mouth of Hudfon's river, in weft long. 72° 31', north lat. 41°.

STATERA-ROMANA, or STEEL-YARD, a name given to the roman balance. See the article BALANCE.

STATES, or ESTATES, a term applied to feveral orders or claffes of people affembled to confult of matters for the public good. See ESTATE.

Thus ftates-general is the name of an affembly confifting of the deputies of the feven united provinces: thefe are ufually thirty in number, fome provinces fending two, others more, and whatever refolution the ftates general take, muft be confirmed by every province, and by every city and republic in that province, before it has the force of a law. The deputies of each province, of what number foever they be, have only one voice, and are efteemed as but one perfon, the votes being given by provinces. Each province prefides in the affembly in its turn, according to the order fettled among them. Guelderland prefides firft, then Holland, &c. See the article STADTHOLDER.

States of Holland are the deputies of eighteen cities, and one reprefentative of the nobility, conftituting the ftates of the province of Holland: the other provinces have likewife their ftates, reprefenting their fovereignty, deputies from which make what they call the ftates general. In an affembly of the ftates of a particular province, one diffenting voice prevents their coming to any refolution.

STATHOLDER. See STADTHOLDER.

STATICE, THRIFT, or COMMON SEA-LAVENDAR, in botany, a genus of the pentandria pentagynia clafs of plants, the corolla whereof is infundibuliform, confifting of five petals, narrow at bottom, and broad, patent, and obtufe at the top: there is no pericarpium: the cup becomes conftringed about the neck,

 and

and its limb is expanded: and in this ftate it retains the feed, which is fingle, very fmall, and roundifh.

STATICS, that branch of mathematics which confiders the motion of bodies arifing from gravity. See MOTION.

Statics then is the doctrine, or theory, of motion, confidered merely as arifing from the weight of bodies; in which fenfe it is diftinguifhed from mechanics, which is the application of ftatics to machines, engines, &c. though, it muft be owned, that ftatics and mechanics are frequently confounded. See the article MECHANICS.

For the laws and principles whereon the doctrine of ftatics is founded, fee the articles GRAVITY, GRAVITATION, DESCENT, &c.

STATICS, *ftatici*, in medicine, a kind of epileptics, or perfons feized with an epileptic fit; during which they contemplate fome ftrong and lively idea, whereby they are diftinguifhed from cataleptics, or perfons feized with a catalepfy. See the articles CATALEPSY and EPILEPSY.

STATION, in geometry, furveying, &c. a place pitched upon to make an obfervation, take an angle, or the like. See OBSERVATION, SURVEYING, &c.

STATION, in the church of Rome, denotes certain churches where indulgences are to be had on certain days: thus we find in their calender, Monday in Rogation week, ftation at St. Maria Maggiore's; Tuefday, ftation at St. John Lateran's, and S. Maria Novella's; and Wednefday, ftation at St. Peter's: and after the fame manner, at other feafons of the year.

STATION is alfo ufed, in the fame church, for the ceremony of the prieft's, or canon's, going out of the choir to fing an anthem before the crucifix, or the image of our lady.

STATIONARY, in aftronomy, fignifies the appearance of a planet, when it feems to remain immoveable on the fame point of the zodiac for feveral days.

As the earth, whence we view the motions of the planets, is out of the center of their orbits, the planets appear to proceed irregularly; being fometimes feen to go forwards, that is, from weft to eaft, which is called the direction; fometimes to go backwards, or from eaft to weft, which is called the retrogradation. Now between thefe two ftates there muft be an intermediate one, wherein the planet neither appears to go backwards nor forwards, but to ftand ftill, and keep the fame place in her orbit; which is called her ftation: and this will happen, when the line that joins the earth's and planet's center is conftantly directed to the fame point in the heavens; that is, when it keeps parallel to itfelf. For all right lines, drawn from any part of the earth's orbit, parallel to one another, do all point to the fame ftar; the diftance of thefe lines being infenfible, in comparifon of that of the fixed ftars.

Saturn is feen ftationary at the diftance of fomewhat more than a quadrant from the fun; jupiter at the diftance of fifty-two degrees; and mars at a much greater diftance.

Saturn is ftationary eight days, jupiter four, mars two, venus one and an half, and mercury an half, though the feveral ftations are not always equal.

STATIONARY-DAYS, in church-hiftory, an appellation given to the weekly faft-days, *viz.* Wednefdays and Fridays; otherwife called half-fafts, and fafts of the fourth and fixth days of the week. See the article FAST.

Thefe fafts are certainly as antient as Clemens Alexandrinus and Tertullian, who both mention them; and the reafon of their inftitution is, becaufe on the fourth day of the week the Jews took council to put our Saviour to death, which was actually accomplifhed on the fixth: however, being in continual ufe throughout the year, they were not kept with fuch rigour and ftrictnefs as Lent. See the article LENT.

STATIONARY FEVER, a peculiar kind of fever, adapted, and owing, to fome general conftitution of the air and feafons. Sydenham obferves, that there are certain general conftitutions of years, which owe their origin neither to heat, cold, drynefs, nor moifture, but rather depend upon a certain fecret and inexplicable alteration in the bowels of the earth, whence the air becomes impregnated with fuch kinds of effluvia, as fubject the human body to peculiar diftempers, fo long as that kind of conftitution prevails, which after a certain courfe of years declines, and gives way to another. Each of thefe general conftitutions is attended with its own proper and peculiar kind of fever, which never appears in any other; and this is thence called a ftationary-fever. See the article FEVER.

STATIVA,

STATIVA, among the Romans, a standing camp kept for the defence of the frontiers of the empire. These camps gave rise to a great many towns, which took their names from the legion stationed there.

STATUARY, *statuaria*, a branch of sculpture, employed in the making of statues. See the article SCULPTURE, and the next article.

Statuary is one of those arts wherein the antients surpassed the moderns; and indeed it was much more popular, and more cultivated among the former than the latter. It is disputed between statuary and painting, which of the two is the most difficult and the most artful. Statuary is also used for the artificer who makes statues. Phidias was the greatest statuary among the antients, and Michael Angelo among the moderns.

STATUE, *statua*, is defined to be a piece of sculpture in full relievo, representing a human figure. Daviler more scientifically defines statue a representation, in high relievo and insulate, of some person distinguished by his birth, merit, or great actions, placed as an ornament in a fine building, or exposed in a public place, to preserve the memory of his worth. In strictness, the term statue is only applied to figures on foot, the word being formed from *statura*, the size of the body.

Statues are formed with the chissel of several matters, as stone, marble, plaster, &c. They are also cast of various kinds of metal, particularly gold, silver, brass, and lead. For the method of casting statues, see FOUNDERY *of statues*.

Statues are usually distinguished into four general kinds: the first are those less than the life, of which kind we have several statues of great men, of kings, and of gods themselves; the second are those equal to the life, in which manner it was that the antients, at the public expence, used to make statues of persons eminent for virtue, learning, or the services they had done: the third, those that exceed the life, among which, those which surpassed the life once and a half, were for kings and emperors, and those double the life, for heroes: the fourth kind were those that exceeded the life twice, thrice, and even more, and were called colossuses. See the article COLOSSUS.

Every statue, resembling the person it is intended to represent, is called *statua iconica*. Statues acquire various other denominations. 1. Thus allegorical statue, is that which, under a human figure, or other symbol, represents something of another kind, as a part of the earth, a season, age, element, temperament, hour, &c. 2. Curule statues, are those which are represented in chariots drawn by bigæ, or quadrigæ, that is, by two, or four horses; of which kind there were several in the circuses, hippodromes, &c. or in cars, as we see some, with triumphal arches, on antique medals. 3. Equestrian statue, that which represents some illustrious person on horse-back, as that famous one of Marcus Aurelius, at Rome; that of king Charles the first, at Charing-Cross; king George the second, in Leicester-Square, &c. 4. Greek statue, denotes a figure that is naked and antique; it being in this manner the Greeks represented their deities, athletæ of the olympic games, and heroes: the statues of heroes were particularly called achillean statues, by reason of the great number of figures of that prince in most of the cities of Greece. 5. Hydraulic statue, is any figure placed as an ornament of a fountain or grotto, or that does the office of a jet d'eau, a cock, spout, or the like, by any of its parts, or by any attribute it holds; the like is to be understood of any animal serving for the same use. 6. Pedestrian statue, a statue standing on foot; as that of king Charles the second in the Royal-Exchange; and of king James the second, in the Privy-Gardens. 7. Roman statue, is an appellation given to such as are cloathed, and which receive various names from their various dresses. Those of emperors, with long gowns over their armour, were called *statuæ paludatæ*: those of captains and cavaliers, with coats of arms, *thoracatæ*: those of soldiers, with cuirasses, *loricatæ*: those of senators and augurs, *trabeatæ*: those of magistrates, with long robes, *togatæ*: those of the people, with a plain tunica, *tunicatæ*: and, lastly, those of women, with long trains, *stolatæ*.

The Romans had another division of statues into divine, which were those consecrated to the gods, as Jupiter, Mars, Apollo, &c. Heroes, which were those of the demi-gods, as Hercules, &c. and Augusti, which were those of the emperors, as those two of Cæsar and Augustus, under the portico of the capitol.

In repairing a statue cast in a mould, they touch it up with a chissel, graver,

or

or other inftrument, to finifh the places which have not come well off: they alfo clear off the barb, and what is redundant in the joints and projectures.

STATURE, the fize or height of a man.

STATUTE, *ftatutum*, in its general fenfe, fignifies a law, ordinance, decree, &c. See the article LAW, &c.

Statute, in our laws and cuftoms, more immediately fignifies an act of parliament made by the three eftates of the realm: and fuch ftatutes are either general, of which the courts at Weftminfter muft take notice, without pleading them; or they are fpecial and private, which laft muft be pleaded. It is held, that a public ftatute, made in affirmation of the common law, extends to all times after the making thereof, although it mentions only a remedy for the prefent: and where a thing is given or granted by ftatute, all neceffary incidents are at the fame time granted with it. The moft natural expofition of a ftatute is, to conftrue one part by another of the fame ftatute, becaufe that beft expreffes the intent of the makers: alfo, ftatutes, in general, ought to be expounded in fuppreffion of the mifchief, and for the advancement of the remedy defigned by any ftatute, yet fo that no innocent perfon may fuffer or receive any damage thereby. It is held, that ftatutes will continue in force though the records of them are deftroyed, &c. But if a ftatute be againft reafon, or impoffible to be performed, the fame is void of courfe.

STATUTE is alfo ufed for a fhort inftrument in writing, termed ftatute merchant, or ftatute-ftaple, which are in the nature of bonds, and called by the name ftatutes, on account of their being made purfuant to the forms prefcribed by certain ftatutes, whereby it is directed, before what perfons, and how they are to be made.

Statute-merchant is defined to be a bond acknowledged before one of the clerks of the ftatutes-merchant of the city of London, or two merchants affigned for that purpofe, or before the mayor, or chief magiftrate of other cities or corporations, or other fufficient perfons, for that end appointed, fealed with the feal of the debtor and the king, upon condition that if the obligor pay not the debt at the day, execution may be awarded againft his body, lands, and goods; in which cafe the recognifee, or obligee, fhall hold the land to him, his heirs, and affigns, until fuch time as the debt is levied; and a perfon who is in poffeffion of land, on fuch a ftatute, is called tenant, by ftatute-merchant.

Statutes-ftaple particularly concern merchants of the ftaple, are of the fame nature with ftatutes-merchant, and are for debts acknowledged before the mayor of the ftaple in our chief cities, &c. in the prefence of one or more of the conftables of the ftaple, by virtue of which the creditor, on non-payment of his money when due, has the fame remedy againft his debtor as is to be had upon a ftatute-merchant. See the article STAPLE.

At firft ftatutes-merchant were contrived for the benefit of merchants only, to provide a fpeedy remedy far recovering their debts; but now they are ufed by others, and are become one of the common fecurities of the kingdom. And a ftatute acknowledged on lands fhall be fatisfied before an obligation, the debt due whereon being but a chofe in action, and recoverable by law; as is a debt upon a ftatute, or recognifance, in which cafe execution may be taken out immediately without further fuit; though ftatutes-ftaple, and likewife ftatutes-merchant, are required to be entered within fix months, or they fhall not be good againft purchafers.

STATUTE-SESSIONS is taken for a meeting of conftables and houfeholders in fome hundreds, by cuftom, for the debating of differences between mafters and fervants, the rating of fervants wages, and beftowing perfons in fervice, &c.

STATUTO-MERCATORIO, a writ which lies for the imprifoning of a debtor, on the forfeiture of his ftatute merchant-bond, until fuch time as the debt be fatisfied.

STATUTO-STAPULÆ, is a writ that lies for the taking of the body of a debtor on a ftatute-ftaple-bond, and for feizing the lands and goods of him that has forfeited fuch bond.

STAVANGER, a port-town of Norway, in the province of Bergen, capital of the territory Stavanger, fituated on a peninfula in the German-ocean: eaft long. 6° 30′, north lat. 59° 30′.

STAVEREN, a port-town of the United-Netherlands, in the province of Weft-Friefland, fituated on the Zuyder-fea: eaft long. 5° 12′, north lat. 53°.

STAVERS, or STAGGERS, among farriers, a giddinefs in a horfe's head, which ends in madnefs. This difeafe is frequently

quently occaſioned by turning out a horſe to graſs too ſoon, before well cold, where, by hanging down his head to feed, bad vapours and humours are generated, which oppreſſing the brain, are the proximate cauſe of this diſeaſe. Sometimes it comes by over-exercife in hot weather, which inflames the blood, *&c.* and ſometimes by noiſome ſmells in the ſtable, exceſſive eating, *&c.* The ſigns of it are dimneſs of ſight, reeling and ſtaggering, watery eyes, *&c.* At length, for perfect pain, he beats his head againſt the wall, thruſts it into the litter, riſes and lies down with fury, *&c.* For the cure of this diſtemper there are various preſcriptions, one of which is, firſt to bleed the horſe, then to diſſolve the quantity of a hazel-nut of ſweet butter in a ſaucer full of wine; then taking ſome lint, or fine flax, dip it in the mixture and ſtop his ears with it, and ſtitch them for twelve hours: ſome boil an ounce and a half of bitter-almonds, two drams of ox-gall, half a pennyworth of black hellebore made into powder, grains of caſtoreum, vinegar and varniſh, of each five drams; which they boil and ſtrain, and then put into his ears.

STAY, in the ſea-language, a big ſtrong rope faſtened to the top of one maſt, and to the foot of that next before it, towards the prow, ſerving to keep it firm, and prevent its falling aftwards or towards the poop. All maſts, top-maſts, and flag ſtaves, have their ſtays, except the ſprit-ſail top-maſts. That of the main-maſt is called the main-ſtay. The main-maſt, fore maſt, and thoſe belonging to them, have alſo back-ſtays to prevent their pitching forwards or over-board, as going on either ſide of her.

To ſtay a ſhip, or to bring her on the ſtays, is to manage her tackle and ſails ſo that ſhe cannot make any way forwards; which is done in order to her tacking about.

STAY, in the manege. To ſtay or ſuſtain the horſe, is to hold the bridle firm and high. We likewiſe ſtay or ſuſtain a horſe with the in-leg or the in-heel, when he makes his croupe go before his ſhoulders upon volts. We ſtay a horſe again when we hinder him to traverſe, when we ride him equally, keeping him always ſubject, ſo that his croupe cannot ſlip out, and he can loſe neither his cadence nor his ground, but marks all his times equal.

STEADY, a word of command, at ſea, for the man at the helm to keep the ſhip ſteady in her courſe, and not to make angles (or yaws, as they call them) in and out.

STEATITES, in the hiſtory of foſſils, a name given by late authors to a ſubſtance called, in Engliſh, ſoap-earth, and which, though the authors on theſe ſubjects had not taken notice of that circumſtance, was the very ſubſtance called cimolia purpuraſcens, or purple earth of Cimolus, by the antients. The later ages, finding the purple cimolian earth of the old writers to be wholly different from their white kind, have given that name (though it is not eaſy to gueſs why) to the common fuller's earth, which has no tinge of purple in its whole ſubſtance. This earth however, called by us ſoap-earth, and ſteatites, is well worth enquiring after, as a ſubſtance for imitating the fine porcelain ware of China. Dr. Woodward much recommends it on this account, and repeated trials have been made of it ſince his time, and ſome of them very lately; in all which it has afforded the fineſt earthen-ware ever made with us, and promiſes fair, with good management, for the equaling any in the world. It is dug in many parts of Devonſhire and Cornwall, and the neighbouring counties; the cliff of the Lizard-point is almoſt wholly compoſed of it, and the adjacent little iſlands abound with it; and from all theſe places it might be brought, at ſmall expence, in any quantities. It is known from all other earths by theſe characters: it is compoſed of extremely fine particles, and is of a firm, equal, and regular texture, and a great weight. It is very firm and hard as it lies in the earth, but when it has been ſome time expoſed to the air, it becomes almoſt of a ſtony hardneſs. It is of a perfectly fine, ſmooth, and gloſſy ſurface, ſofter to the touch than any other ſpecies of earth, and does not at all adhere to the tongue, or ſtain the fingers in handling: but drawn along a rough ſurface, as a piece of cloth, or the like, it marks it with a fine and even white line. In colour it is a clear white, veined and variegated very beautifully with purple of different degrees of deepneſs, and is of ſo fine a ſtructure of parts, that when cut into thin pieces it is in ſome degree tranſparent. It makes no effervеſcence with acids, and burns to a pure white, even in its purple parts.

STEATOMA, a kind of encyſted tumour, conſiſting of a matter like ſuet or lard,

lard, soft, without pain, and without discolouring the skin. See TUMOUR.

STEEL, a kind of iron refined and purified by the fire with other ingredients. See the article IRON.

Steel, of all other metals, is that susceptible of the greatest degree of hardness when well tempered, whence its great use in the making of tools and instruments of all kinds. Mr. Cramer observes, that the difference between iron and steel is, that the latter being much harder will not yield to the hammer, but is brittle instead of being ductile, and resists the file. Malleable iron grows rigid by being simply extinguished in cold water, but it yet retains a considerable degree of ductility in the cold, and may be extended in all dimensions with the hammer. Steel, however, if heated again, and cooled by slow degrees, may be filed and extended more or less by the hammer. But there are many degrees in the hardening of steel; for if it has been extremely red hot, and is then quenched in cold water in motion, it becomes greatly harder than if it had been but moderately red hot, and had been quenched in warm water. Steel is also of a darker colour than iron, and the surface of it, when broken, appears to consist of smaller granulated, or even striated, particles than the iron it was made of. Mr. Cramer further observes, that the method of making steel out of iron is either by cementation or by fusion. That by cementation may be performed in the following manner: choose some bars of pure iron, not too thick, and quite free from heterogeneous matter, the flexibleness of it, both when hot and cold, being a very good sign thereof: prepare a cement of charcoal-dust, moderately pulverized, one part; and wood-ashes, half a part: or of charcoal dust two parts, bones, horns, or hair of animals, burnt to a blackness, in a close vessel and in a gentle fire, and afterwards reduced to powder, one part; wood-ashes, half a part: mix them together: prepare an earthen cylindrical vessel, two or three inches higher than the bars are long; put into the bottom of this vessel the cement, prepared as before directed, so that being gently pressed down it may cover the bottom of the vessel an inch and half deep; place then the bars perpendicularly, so that they may be every where about an inch from the sides of the vessel and from each other; fill the interstices with the same cement, and cover also the bars with it, so that the vessel may be quite full; next cover it with a tile, and stop the joints with thin lute: put this vessel into a furnace, and keep it moderately but equally red hot, for six or ten hours together; when this is over, take the red hot bars out and dip them in cold water, they will then be brittle, and turned to steel. See CÆMENTATION.

The method of making steel by fusion is as follows: take of iron-ore, or of unmalleable iron, of the first fusion, divide it into small parcels, and put them into a bed made of charcoal-dust, in a smith's forge: let the quantity of iron be but small for the experiment; put to it, as a defensitive menstruum, some of the vitrescent scoriæ of sand, or stones of the same nature; then put upon them a quantity of charcoal; light this, and admit only a gentle blast of the bellows, that the scoriæ and the metal may both melt regularly: when this has been some time kept in fusion, take it out, and divide it into two parts, which make red hot, and hammer into long bars: finally, beat them red hot, and plunge them into cold water, and they will be found to be steel, so very hard as not to be fileable, and so brittle as to break asunder when struck with considerable force.

A bar of iron, when converted into steel, is not equally so converted in all its parts; the fire has always acted more strongly upon its surface than on its central parts, and it is therefore more perfect steel there than in its inner parts; but a perfection in the operation is not necessary to the steel's being good and useful, for the whole bar is often very good steel, as are also many bars made at the same time, yet all, perhaps, differently affected.

If the composition which is to convert the iron into steel be too strong, or if the fire be too violent, or the matter continued too long in it, in all these cases the steel will be over made. The way to meliorate such steel as this, must be to divest it of part of its salts and its sulphur, but particularly the last; and M. Reaumur found, that, burying the bars of such steel in lime, or any other alkaline substance that would readily absorb the sulphurs, and placing it for a proper time in the fire, it would be in a manner decomposed again, and come out a very good and perfect steel.

By this management steel may again be converted

converted or reduced to its primitive iron, and a body of any middle degree between ſteel and iron may be produced by ſtopping the proceſs at different points of time, or continuing it till all the adventitious ſalts and ſulphurs are drawn off or abſorbed. See TEMPERING.

Annealing or nealing of ſteel, is by ſome uſed for the ſoftening it, in order to make it work eaſier, which is uſually done by giving it a blood-red heat in the fire, and then taking it out and letting it cool of itſelf: ſome have pretended to ſecrets in annealing, by which they could bring down iron or ſteel to the temper of lead: this was done by often heating the metal in melting lead, and letting it cool again out of the lead. But this method is found by Moxon to have no other effect than what is had from the former. Steel may, indeed, be made a little ſofter than in the common way, by covering it with coarſe powder of cow-horn or hoofs; thus incloſing it in a loam, heating the whole in a wood-fire till it be red hot, and then leaving the fire to go out of itſelf, and the ſteel to cool.

Steel manufactures, for every twenty ſhillings value, upon oath, pay, upon importation, 3 s. $10\frac{20}{100}$ d. and, on exportation, draw back, 3 s. $4\frac{50}{100}$ d. Steel manufactures, for every 112 lb. pay, on importation, 5 s. $1\frac{87\frac{1}{2}}{100}$ d. and, on exportation, draw back the ſame money. But if exported to the britiſh plantations there is no drawback.

STEEL GLASSES, a name given by ſome authors to the metalline ſpheres uſed in optics. Theſe, according to Cardan, are made of three parts of braſs, one part of tin, and one of ſilver, with an eighteenth part of antimony; but moſt either totally leave out the ſilver, or add only a twenty-fourth part, to ſave the expence. There are many other methods directed by ſeveral authors, but moſt uſe arſenic and tartar mixed with the metals. Theſe are afterwards to be poliſhed with emery, rotten-ſtone, putty, and the like.

STEELYARD, *ſtatera romana.* See the article BALANCE.

STEENBERG, a town of dutch Brabant, ſituated on the confines of Zeland, twenty-five miles north of Antwerp.

STEENKIRK, a village of the auſtrian Netherlands, in the province of Hainault, ten miles north of Mons.

STEENWICK, a town of the United Netherlands, in the province of Overyſſel, ſituated near the confines of Frieſland, eighteen miles north of Zwoll.

STEEPLE, an appendage erected generally on the weſtern end of a church, to hold the bells. Steeples are denominated from their form, either ſpires or towers; the firſt are ſuch as aſcend continually diminiſhing either conically or pyramidally. The latter are mere parallelopipeds, and are covered a-top platform-like. See the articles SPIRE and TOWER. In each kind there is uſually a ſort of windows or apertures to let out the ſound, and ſo contrived at the ſame time, as to drive it down.

STEERAGE, on board a ſhip, that part of the ſhip next below the quarter-deck, before the bulk-head of the great cabbin, where the ſteerſman ſtands in moſt ſhips of war. See the next article.

STEERING, in navigation, the directing a veſſel from one place to another by means of the helm and rudder. He is held the beſt ſteerſman who cauſes the leaſt motion in putting the helm over to and again, and who beſt keeps the ſhip from making yaws, that is, from running in and out. There are three methods of ſteering, 1. By any mark on the land, ſo as to keep the ſhip even by it. 2. By the compaſs, which is by keeping the ſhip's head on ſuch a rhumb or point of the compaſs, as beſt leads to port. 3. To ſteer as one is bidden or conned, which, in a great ſhip, is the duty of him that is taking his turn at the helm. See the article CON D.

For the theory and effect of ſteering, ſee NAVIGATION, SAILING, &c.

STEEVE, on board a ſhip. The ſeamen ſay the bowſprit or the beak-head of a ſhip ſteeves, when it ſtands too upright, or not ſtraight enough forward.

STEGANIUM, SLATE, in foſſil-hiſtory. See the article SLATE.

STEGANOGRAPHY, the art of ſecret writing, or of writing in cyphers, known only to the perſons correſponding.

STEGEBURG, a port-town of Sweden, in the province of Eaſt Gothland, ſituated on a bay of the Baltic: eaſt longitude 16°, north latitude 58° 30′.

STEGNOTICS, in medicine, remedies proper to cloſe and ſtop the orifices of the veſſels or emunctuories when relaxed, ſtretched, lacerated, &c. ſuch as pomegranate-leaves and roſes, plantain-leaves, tormentil-roots, &c. Stegnotics are pro-

per in the hæmorrhoids and other fluxes of the blood.

STELLA, a STAR. See the article STAR.

STELLATE, among botanifts, expreffes leaves which grow not lefs than fix at a joint, and are arranged like the rays of a ftar.

STELLERA, in botany, a genus of the octandria-monogynia clafs of plants, without any calyx; the corolla confifts of a fingle, bell-fhaped, permanent petal; there is no pericarpium, and the feed is fingle, fhining, and beaked.

STELLIONATE, *ftellionatus*, in the civil law, a kind of crime committed by a fraudulent bargain, where one of the parties fells a thing for what it is not; as if I fell an eftate for my own which belongs to another, or convey a thing as free and clear which is already engaged to another, or put off copper for gold, *&c.*

STEM, in botany, that part of a plant arifing out of the root, and which fuftains the leaves, flowers, fruits, *&c.* See the article STALK.

STEM *of a fhip*, that main piece of timber which comes bending from the keel below, where it is fcarfed, as they call it; that is, pieced in; and rifes compaffing right before the forecaftle. This ftem it is, which guides the rake of the fhip, and all the butt-ends of the planks are fixed into it. This, in the fection of a firft rate fhip, is called the main ftem. See the article SHIP.

Falfe ftem, in a fhip, is that fixed before the right one, where that is made too flat for the fhip to keep the wind well; this will make her rid more way, and bear a better fail.

STEMPLES, in mining, crofs-bars of wood in the fhafts which are funk to mines. In many places the way is to fink a perpendicular hole or fhaft, the fides of which they ftrengthen from top to bottom with wood-work, to prevent the earth from falling in; the tranfverfe pieces of wood ufed for this purpofe, they call ftemples, and by means of thefe the miners, in fome places, defcend without ufing any rope, catching hold of thefe with their hands and feet.

STENAY, a town of the french Netherlands, in the province of Luxemburg, fituated on the eaft fide of the river Maes, twelve miles weft of Montmedy.

STENCH. See the article STINK.

STENDEL, a town of Germany, in the circle of Upper Saxony, and marquifate of Brandenburg, fituated thirty-fix miles north of Magdeburg.

STENFORT, a town of Germany, in the circle of Weftphalia, and county of Bentheim, fituated eighteen miles north of Munfter.

STENONIAN DUCT, or *ductus falivus ftenonius*, in anatomy, a name given from Steno, its difcoverer, to one of the fuperior falival ducts running from each of the parotids, about three fingers long, and of the thicknefs of a wheat-ftraw, having a great number of roots. This duct paffes over the mafseter mufcle through the middle of the cheek, and there perforates the buccinator mufcle, and the membrane of the mouth near the fecond or third of the ductus molares, and at this perforation it difcharges a very large quantity of its proper fluid into the mouth. See SALIVAL, PAROTIDES, *&c.*

STENTOROPHONIC TUBE, a fpeaking trumpet, thus called from Stentor, a perfon mentioned by Homer. See the article TRUMPET.

STEP. See the article STAIRCASE, *&c.*

STEP *of the maft and capftan*, in a fhip, is that piece of timber whereon the mafts or capftans do ftand at bottom.

STEP *and leap*, in the manege, one of the feven airs or artificial motions of a horfe, confifting, as it were, of three airs, *viz.* the pace or ftep, which is terra a terra; the raifing, which is the curvet, and the whole finifhed with a fault or leap. The ftep properly puts a horfe on the hand, and gives him a rife to leap; like one that runs before he leaps, that he may go the higher or the farther. For leaps of all kinds, the rider is not to give any aids or helps with his legs, only to hold the horfe well up with the bridle-hand when he rifes before, that he may rife the higher behind. When he begins to rife behind, he is to put the bridle-hand a little forwards to hold him before, and ftay him there on the hand as if he hung in the air, timing the motion of the bridle-hand fo, as to make him like a ball on the bound, which is the great fecret in leaping.

STEPHEN, or *St.* STEPHEN'S DAY, a feftival of the chriftian church, obferved on the 26th of December, in memory of the firft martyr St. Stephen.

STERCULIA, in botany, a genus of the monoecia-monodelphia clafs of plants: the calyx of the male and female flowers is a very large, coriaceous, fingle leafed peri-

perianthium, divided into five ſegments: there is no corolla; the fruit is orbicular, depreſſed, and generally divided into five cells: the ſeeds conſiſt of a great number of oval kernels.

STEREOGRAPHIC PROJECTION, is the projection of the circles of the ſphere on the plane of ſome one great circle, the eye being placed in the pole of that circle. The method and practice of this projection in all the principal places, *viz.* on the planes of the meridian, equinoctial, and horizon, have already been given under MAP and PROJECTION.

STEREOGRAPHY, the art of drawing the forms and figures of the ſolids upon a plane. See SOLID and PLANE.

STEREOMETRY, στερεομετρια, that part of geometry which teaches how to meaſure ſolid bodies, *i. e.* to find the ſolidity or ſolid content of bodies, as globes, cylinders, cubes, veſſels, ſhips, *&c.* See the articles GLOBE, CYLINDER, *&c.*

STEREOTOMY, the art or act of cutting ſolids, or making ſections thereof, as walls or other members in the profiles of architecture. See SECTION.

STERILITY, the quality of a thing that is barren, in oppoſition to fertility. See the article FERTILITY.

Nature has annexed ſterility to all monſtrous productions, that the creation might not degenerate. Hence the ſterility of mules, *&c.*

Women frequently become ſterile after a miſcarriage or a difficult labour, by reaſon the uterus or ſome other of the genital parts are injured thereby.

STERLING, a term frequent in britiſh commerce. A pound, ſhilling, or penny ſterling, ſignifies as much as a pound, ſhilling, or penny of lawful money of Great Britain, as ſettled by authority.

STERN *of a ſhip*, uſually denotes all the hindermoſt part of her, but properly it is only the outmoſt part abaft. See the article SHIP, ABAFT, *&c.*

STERN-FAST, denotes ſome faſtenings of ropes, *&c.* behind the ſtern of a ſhip, to which a cable or hawſer may be brought or fixed, in order to hold her ſtern to a wharf, *&c.*

STERN-POST, a great timber let into the keel at the ſtern of a ſhip, ſomewhat ſloping, into which are faſtened the after-planks; and on this poſt, by its pintle and gudgeons, hangs the rudder.

STERN, among hunters, is the tail of a wolf of greyhound. See TAIL.

STERN-CHASE. See the article CHASE.

STERNBERG, a town of Germany, in the circle of Upper Saxony and marquiſate of Brandenburg, ſituated twenty-three miles north-eaſt of Frankfort upon the Oder.

STERNOHYOIDÆUS, in anatomy, a long, thin, flat muſcle, fixed by its lower extremity in the ſuperior and lateral part of the inner or poſterior ſide of the ſternum, in the poſterior part of the ſternal extremity of the clavicle, in the tranſverſe ligament which connects theſe two bones, and in the inner or backſide of the cartilage of the firſt rib: from hence it runs up to the foreſide of the aſpera arteria, joins its fellow by a membrane which forms a ſort of linea alba, and is inſerted laterally in the lower edge of the baſis of the os hyoides.

STERNUM, in anatomy, the breaſt-bone, being a cartilaginous ſort of bone which compoſes the forepart of the breaſt, and into which the ribs are fitted. See the article RIBS.

In adults this bone is often ſingle, but ſometimes it has two, ſometimes three, pieces concurring to form it. Its ſubſtance is fungous and ſpungy; its upper part is called the manubrium or handle, and in this there is on each ſide a cavity for the articulation of the clavicles. In the middle it is narrow, and broad at the lower part. To this alſo there adheres a cartilage called from its figure cartilago enſiformis, or xiphoides. This is uſually ſingle; ſometimes it is bifurcated, and not unfrequently bony throughout; and on each ſide of the ſternum there are ſeven cavities for the articulation of the ſeven true ribs.

The uſes of the ſternum are, 1. To form the anterior part of the breaſt. 2. To ſupport the ribs and the clavicles. 3. To defend the parts contained in the cavity of the breaſt. 4. To ſerve for the inſertion of the mediaſtinum, and for the ſuſtaining the heart itſelf and ſeveral muſcles.

The ſternum is equally ſubject to depreſſions and fractures from falls or blows with the reſt of the bones. When either of theſe happen, the part is not only uneven and painful, but the ſubjacent arteries and veins are alſo contuſed or ruptured; whence ariſe pains in the breaſt, difficulty of breathing, violent coughs, ſpitting of blood, or elſe extravaſations of it in the præcordia, or between the duplicatures of the mediaſtinum, with many bad ſymptoms of the like nature.

nature. A fractured sternum will therefore be very evident from these signs, and from its being moveable to the touch, especially when one part grates against another. In order to set the fracture of this bone, if any part of it be displaced, Heister directs the patient to be laid on his back on a bed or table, putting a hard pillow, a large parcel of cloth rolled up, or some other such body under his back, and pressing down his shoulders, by which means the sternum will be elevated and extended; and to facilitate the reduction, the surgeon must press the sides of the breast together, and stroke them pretty strongly; but when this method is impracticable, or not proper, the skin must be divided, and the depressed part of the sternum lifted up into its place by means of an elevatory, or else by a screw gently wormed into the part, and then pulled upwards. If, as it sometimes happens after the reduction, violent pains continue under the sternum, and if blood should gather and suppurate internally between the duplicature of the mediastinum, it will not be improper to trepan the lower part of the sternum, after the manner done to the cranium; and when the putrid matter is discharged, and the cavity cleansed, it should be carefully treated with some vulnerary balsam. Lastly, if any blood should be found extravasated in the cavity of the thorax, the cure seems to depend entirely upon discharging this by the paracentesis. See the articles ELEVATORY, TREPANNING, EXTRAVASATION, and PARACENTESIS. As to the business of dressing, after the application of compresses dipped in warm spirit of wine, we must go on with that kind of bandage called the napkin and scapulary.

STERNUTATION. See SNEEZING.

STERNUTATIVE, or STERNUTATORY, a medicine proper to produce sneezing. Sternutatives are of two kinds, gentle and violent. Of the first kind are betony, sage, marjoram, tobacco, and the whole fashionable tribe of snuffs. Of the latter kind are euphorbium, white hellebore, pellitory, &c. Sternutatives operate by their sharp pungent parts, vellicating the inner membrane of the nose, which is exceeding sensible, and occasioning the serous matter contained in the glands of the nose and in several sinuses situated in the base of the cranium and the os frontis, to be expelled.

STETIN, a city and port-town of Germany, in the circle of Upper Saxony, capital of the dutchy of Pomerania, situated on the west shore of the river Oder: east long. 14° 50′, north lat. 53° 30′.

STEVENAGE, a market-town of Hertfordshire, situated thirty miles north of London, and ten northwest of Hertford.

STEVENSWAERT, a fortress of the Netherlands, in the province of Gelder, situated on the river Maes, twenty miles north-east of Maestricht.

STEW, a small kind of fish-pond, the peculiar office of which is to maintain fish, and keep them in readiness for the daily use of a family, *&c.* The fish bred in the large ponds, are drawn out and put in here. For two large ponds of three or four acres a-piece, it is adviseable to have four stews, each two rods wide, and three long. The stews are usually in gardens, or at least near the house, to be more handy, and the better looked to. The method of making them is to carry the bottom in a continued decline from one end, with a mouth to favour the drawing with a net. See FISH-POND.

STEWS, or STUES, were also places antiently permitted in England to women of professed incontinency, for the proffer of their bodies to all comers. These were under particular rules and laws of discipline, appointed by the lord of the manor.

STEWARD, an officer appointed in another's stead or place, and always taken for a principal officer within his jurisdiction. Of these there are various kinds. The greatest officer under the crown is the lord high steward of England, an office that was antiently the inheritance of the earls of Leicester, till forfeited by Simon de Mountfort, to king Henry III. But the power of this officer is so very great, that it has not been judged safe to trust it any longer in the hands of a subject, excepting only *pro hac vice*, occasionally: as to officiate at a coronation, at the arraignment of a nobleman for high-treason, or the like. During his office, the steward bears a white staff in his hand, and the trial, *&c.* ended, he breaks the staff, and with it his commission expires. There is likewise a lord steward of the king's household, who is the chief officer of the king's court, has the care of the king's house, and authority over all the officers and servants of the houshold, except such as belong to the chapel, chamber, and stable. See the article HOUSHOLD.

There

There is alſo a ſteward of the marſhalſea, who has judicial authority. And in moſt corporations, and all houſes of quality in the kingdom, there is an officer of the name and authority of a ſteward. The ſteward of a ſhip is he who receives all the victuals from the purſer, and is to ſee it well ſtowed in the hold; all things of that nature belonging to the ſhip's uſe are in his cuſtody; he looks after the bread, and diſtributes out the ſeveral meſſes of victuals in the ſhip; he hath an apartment for himſelf in the hold, which is called the ſteward's room.

STEWARTEA, in botany, a genus of the monadelphia-polyandria claſs of plants, with a ſingle leafed patent perianthium, divided into five ſegments: the corolla conſiſts of five large, oval, patent, and equal petals: the fruit is an oval capſule, with five angles, five cells, and five valves, containing ſeveral kernels.

STEYNING, a borough-town of Suffolk, ſituated forty miles ſouth of London, and thirteen miles weſt of Lewes.

It ſends two members to parliament.

STEYRE, or STYREG, a town of Germany, in the circle and dutchy of Auſtria, ſituated on the north-ſide of the Danube, eight miles north-weſt of Ens.

STIBIUM, *antimonium.* See ANTIMONY.

STICKLEBACK, in ichthyology, a common name for the three ſeveral ſpecies of the Gaſteroſteus. See GASTEROSTEUS. The common ſtickleback is that with three prickles on the back; the leſſer ſtickleback is that with ten prickles on the back; and the great ſea-ſtickleback has fifteen prickles on the back, grows to ſix or ſeven inches in length, and is moderately thick in proportion.

STIGMATA, in natural hiſtory, the apertures in different parts of the bodies of inſects, communicating with the tracheæ, or air veſſels, and ſerving for the office of reſpiration. Nature has given to theſe minute animals a much larger number of tracheæ and bronchia than to us; all the two winged and four winged flies, which have a ſingle or undivided corcelet, to which their legs are all fixed, have alſo four ſtigmata in that corcelet, two on each ſide; they have them alſo on the rings of their body, but thoſe on the corcelet are the moſt conſiderable. Of the four on the corcelet, the two anterior ones are uſually the largeſt; theſe, as well as the poſterior ones are oblong, and placed obliquely to the length of the body. The colour of the ſtigmata frequently differs from that of the corcelet; ſome are yellowiſh, others of a coffee-colour, or ſome degrees of a fallow colour, in flies whoſe corcelet is brown, black, or blue. Flies have, beſide theſe, ſeveral ſtigmata alſo in the rings of their bodies, perhaps in every one of them: theſe ſtigmata are not like thoſe of the corcelet, but are round, uſually a little eminent above the reſt of the ſurface, and reſembling a pin's head.

STIGMATA, in antiquity, certain marks impreſſed on the left ſhoulders of the ſoldiers when liſted.

STIGMATA were alſo kinds of notes or abbreviations, conſiſting only of points diſpoſed various ways, as in triangles, ſquares, croſſes, &c.

STIGMATIZING, among the antients, was inflicted upon ſlaves, as a puniſhment, but more frequently as a mark to know them by, in which caſe it was done by applying a red-hot iron marked with certain letters to their foreheads, till a fair impreſſion was made, and then pouring ink into their furrows, that the inſcription might be the more conſpicuous. Stigmatizing, among ſome nations, was, however, looked upon as a diſtinguiſhing mark of honour and nobility.

STIL *de grain*, in the colour-trade, the name of a compoſition uſed for painting in oil or water, and is made by a decoction of the lycium or avignon-berry in alum-water, which is mixed with whiting into a paſte, and formed into twiſted ſticks. It ought to be choſen of a fine gold-yellow, very fine, tender and friable, and free from dirt.

STILE, *ſtilus.* See the article STYLE.

STILES, in carpentry, denote the upright pieces which go from the bottom to the top of any wainſcot, or the like.

STILLATITIOUS OILS, ſuch as are produced by diſtillation, in oppoſition to thoſe got by infuſion, expreſſion, &c.

STILL-BOTTOMS, in the diſtillery, a name given by the traders to what remains in the ſtill after the working the waſh into low wines. Theſe bottoms are procured in the greateſt quantity from the malt-waſh, and are of ſo much value to the diſtiller, in the fattening of hogs, &c. that he often finds them one of the moſt valuable articles of the buſineſs. They might alſo, as Dr. Shaw obſerves, be put to other uſes, ſuch as the affording a large proportion of acid ſpirit, an oil, a fuel, and a fixed ſalt, and

and with fome addrefs, and good management, a vinegar and tartar; another very advantageous ufe of them, is the adding them to the next brewing of the malt for more fpirit: the increafe of the produce from this is more than is eafily conceived. It alfo more readily difpofes the new wafh to ferment, and gives the fpirit a vinofity, that it cannot have without it; the proportion in this cafe muft never exceed that of a fifth or a fixth part of the whole quantity of liquor employed. See DISTILLERY.

STILL-HOUSE. The Dutch have much the advantage of us in the ftructure of their ftill-houfes. The general rules in building thofe houfes, according to Shaw, fhould be fuch as follow. The firft caution is, to lay the floor aflope, not flat, where any wet work is to be performed. It fhould alfo be well flagged, with broad ftones, fo that no wet be detained in the crevices, but all may run off, and be let out at the drains made at the bottom and fides. The ftills fhould be placed abreaft on that fide of the ftill-houfe to which the floor has its current. Fronting the ftills, and adjoining to the back of the wall, fhould be a ftage for holding the fermenting backs, and thefe being placed at a proper height, may empty themfelves by means of a cock and a canal into the ftills which are thus charged with very little trouble. Near this fet of fermenting backs fhould be placed a pump or two, that may readily fupply them with water, by means of a trunk, or canal, leading to each back; under the pavement adjoining to the ftills fhould be a kind of cellar, wherein to lodge the receivers, each of which fhould be furnifhed with its pump, to raife the low wines into the ftill for rectification; and through this cellar the refufe wafh, or ftill bottoms, fhould be difcharged by means of a hofe, or other contrivance.

STIMULATING, *ftimulans*, a property in angular or fharp bodies, whereby they vellicate and caufe vibrations and inflections of the fibres of the nerves, and a greater derivation of nervous fluid into the parts affected. Stimulants produce pain, heat, rednefs, &c. They may be reduced to violent penetrating depilatories, gentle finapifms, veficatories, and cauftics. See the articles SINAPISM, VESICATORY, &c.

STING, *aculeus*, an apparatus in the body of certain infects, in form of a little fpear, ferving them as a weapon of offence. The fting of a bee or wafp, is a curious piece of mechanifm, it confifts of a hollow tube, at the root whereof there is a bag full of fharp, penetrating juice, which in ftinging is injected into the flefh, through the tube; within the tube, Mr. Derham has obferved, there lie two fharp fmall bearded fpears: in the fting of a wafp, he told eight beards on the fide of each fpear, fomewhat like the beards of fifh-hooks. One of thefe fpears in the fting, or fheath, lies with its point a little before the other, to be ready, as fhould feem, to be firft darted into the flefh, which once fixed by means of its foremoft beard, the other then ftrikes too, and fo they alternately pierce deeper and deeper, their beards taking more and more hold in the flefh; after which the fheath or fting follows, to convey the poifon into the wound, which that it may pierce the better, is drawn into a point with a fmall flit below that point for the two fpears to come out at. By means of thefe beards, it is, that the animal is forced to leave its fting behind it, when difturbed, becaufe it can have no time to withdraw the fpears into the fcabbard.

Heifter affures us, that the beft cure for the fting of bees or wafps is to anoint the part with vinegar mixed with theriaca; or theriaca mixed with fpirit of wine; or armenian bole with vinegar.

STINK, or STENCH, a difagreeable fmell exhaling from a corrupted, or other body, and which is prejudicial to the nofe and brain. A ftinking breath is ufually the refult either of difeafed lungs, or elfe of fcorbutic gums, &c. A ftinking nofe is the refult of a deep ulcer within the nofe, whence arife fetid fcales, &c. See the article FOETOR.

STINT, in zoology, the name of a fmall bird common about the fea fhores in many counties of England, and feeming to be the fame with the cinclus prior of Aldrovand, and the fchæniclos, or junco of Bellonius, called by the french *alouette de mer*, the fea-lark. See ALAUDA.

It is fomewhat fmaller than the common lark, and in fhape refembles the fmaller fnipe. Its beak is black, flender, and ftrait; its feet of a greenifh, or brownifh, black; its back is grey, variegated with oblong, black fpots, and its wings fomewhat of a reddifh brown; its neck is grey, and its head variegated with black and a reddifh brown; its wings are long, and

and when folded reach beyond the end of the tail; and its rump is somewhat reddish, with black streaks.

STIPA, in botany, a genus of the triandria-digynia class of plants, the calyx of which is a bivalve glume, consisting of a single flower: the corolla is also bivalve; the fruit adheres to the calyx; and the seed is single, oblong, and covered.

STIPEND, *stipendium*, among the Romans, signified the same with tribute; and hence stipendiarii were the same with tributarii.

STIPULATION, in the civil law, the act of stipulating, that is, of treating and concluding terms and conditions to be inserted in a contract. Stipulations were antiently performed at Rome, with abundance of ceremonies; the first whereof was, that one party should interrogate, and the other answer, to give his consent, and oblige himself. By the the antient roman law, no body could stipulate but for himself; but as the tabelliones were public servants, they were allowed to stipulate for their masters, and the notaries, succeeding the tabelliones, have inherited the same privilege.

STIRIA DUTCHY, in Germany, is part of the circle of Austria, bounded by the dutchy of Austria on the north; by Hungary on the east; and by Carinthia and Carniola on the south-west.

STIRLING, or STRIVILING, a town of Scotland, capital of the county of Stirling, situated on the river Forth, thirty miles north-west of Edinburgh, defended by a castle and other works.

STIRRUP, or STIRROP, in the manege, a rest, or support for the horseman's foot, serving to keep him firm in his seat, and to enable him to mount. The great art of a cavalier in the antient tournaments, was to make his antagonist loose his stirrup, that is, slip the foot out of it. For combating, it is a rule to have the right foot-stirrup somewhat shorter than the other. The stirrup-foot is the near, or the left foot before. Stirrup-leather is a thong of leather descending from the saddle by the horse's ribs, upon which the stirrups hang, and the stirrup-bearer is an end of leather made fast to the end of the saddle, to truss up the stirrup when the rider is alighted, and the horse sent to the stable.

STIRRUP *of a ship*, a piece of timber put upon a ship's keel, when some of her keel happens to be beaten off, and they cannot come conveniently to put or fit in a new piece; then they patch in a piece of timber, and bind it on with an iron, which goes under the ship's keel, and comes up on each-side of the ship, where it is nailed strongly with spikes, and this they call a stirrup.

STIRUM, a town of Germany, in the dutchy of Berg, twelve miles north of Dusseldorp.

STIVES, the antient Thebes, in the province of Achaia, now Livadia, in european Turkey. See LIVADIA.

STOAKED, on board a ship. When the water in the bottom cannot come to the well of the pump, they say, the ship is a-stoak, or stoaked: so they say also, the limber holes are stoaked, when the water cannot pass through them; and the pump is stoaked, when something is got into it, which choaks it up, so that it will not work.

STOCKHERN, a town of Germany, in the circle of Westphalia, and bishopric of Liege, situated on the river Maes, twelve miles north of Maestricht.

STOCK, in gardening, *&c.* the stem or trunk of a tree.

STOCKBRIDGE, a borough town of Hampshire, situated seven miles north-west of Winchester.

It sends two members to parliament.

STOCK-BROKER, see the article BROKER, and the next article.

STOCK-JOBBING, the art or mystery of trafficking in the public stocks or funds. If stock-jobbers make any contract for the sale of stock, when they are not actually possessed of, or intitled to the same, those contracts will be deemed void. Likewise the parties so agreeing to sell, are liable to a penalty of 500 l. The time of tendering stock sold, is held to be the last hour of the day on which it was to be transferred, and then an actual transfer is not necessary, unless the person to whom it ought to be made be at the place and time ready to receive the same. See the article BROKER.

STOCK-FISH, or STOCK-FISCH, in commerce, a kind of dried salted-fish, of a greyish ash-colour, and the belly somewhat whiter, being only cod-fish cured in a particular manner, which makes it necessary to beat it with sticks before it is fit for dressing. See FISHERY.

STOCKHOLM, the capital city of Sweden, situated on several small islands in the Meller Lake; east long. 18°, north lat. 59° 30′, three hundred miles north-east

east of Copenhagen; nine hundred north-east of London; and four hundred west of Petersburgh. It is neither walled nor fortified, being sufficiently secured by nature, with little rocks and islands, which surround it, though it has a spacious harbour sufficient for the largest fleets. That part of the town which is properly the city, stands upon a little island that is not more than a mile and a half in circumference, but the suburbs on the adjacent islands, are much larger. The inhabitants are computed about thirty thousand.

STOCKING, that part of the cloathing of the leg and foot which immediately covers their nudity, and screens them from the cold, *&c.* Antiently, the only stockings in use were made of cloth, or of milled stuffs sewed together; but since the invention of knitting and weaving stockings of silk, wool, cotton, thread, *&c.* the use of cloth stockings is quite out of doors. The modern stockings, whether woven or knit, are a kind of plexuses, formed of an infinite number of little knots called stitches, loops, or mashes, intermingled in one another. Knit stockings are wrought with needles made of polished iron or brass wire, which interweave the threads, and form the mashes the stocking consists of. This operation is called knitting, the invention whereof is commonly attributed to the Scots, on this ground, that the first works of this kind came from thence. It is added, that it was on this account that the company of stocking-knitters established at Paris, in 1527, took for their patron St. Fiacre, who is said to be the son of a king of Scotland. Woven stockings are ordinarily very fine; they are manufactured on a frame, or machine of polished iron, the structure and apparatus whereof being exceedingly ingenious, are represented in plate CCLXI. where A is the jack for the bobbins to turn upon; B is the sizer, or woman whose business it is to twist the threads as they shall best suit the frame, in which the work is to be performed; C, the rices which wind the hanks or skains upon the bobbins for the use of the sizer; D, the winder; and E the stocking frame, or engine, with the maker at work. 1. Are the treddles, like those of other sorts of looms; 2. is the bobbin of twisted silk, *&c.* fixed on the bobbin-wire, which it turns with ease to feed the engine; 3. is the wheel, by whose motion the jacks are drawn together upon the needles; 4. is the silk, *&c.* which runs off the bobbin, and is in that posture directed up to the needle to be looped; 5. is the needle on which the stockings are made according to art. The English and French have greatly contested the honour of the invention of the stocking loom; but we are assured, whatever pretensions the French claim to this invention, that the same was certainly devised by William Lee, of St. John's College, Cambridge, in the year 1589, though it is true, that he first made it public in France, after despairing of success in his own country.

Cotton and thread-stockings, the dozen, on importation, pay 8 s. $4\frac{53\frac{3}{4}}{100}$ d. and draw back on exportation, 7 s. $6\frac{56\frac{1}{4}}{100}$ d.

Frames and engines for the making and knitting of stockings, gloves, *&c.* shall not be exported upon penalty of 40 l.

STOCKPORT, a market-town of Cheshire, situated thirty-four miles north-east of Chester.

STOCKTON, a port-town of Durham, situated near the mouth of the river Tees, sixteen miles south of Durham.

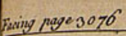
STOCKZOW, a town of Bohemia, in the dutchy of Silesia, situated on the river Vistula, thirty-seven miles south-east of Troppaw.

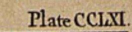
STOCKS, among ship-carpenters, a frame of timber, and great posts made ashore, to build pinnaces, ketches, boats, and such small craft, and sometimes small frigates. Hence we say, a ship is on the stocks, when she is a building.

STOCKS, *cippus*, a wooden machine to put the legs of offenders in, for the securing of disorderly persons, and by the way of punishment in divers cases, ordained by statute, *&c.* And it is said, that every vill within the precinct of a torn is indictable for not having a pair of stocks, and shall forfeit 5 l.

STOEBE, in botany, a genus of the syngenesia-polygamia æqualis class of plants; the hermaphrodite corolla of all the flosscules is equal; the proper one is monopetalous and funnel-shaped; the limb is quinquifid and patulous; there is no pericarpium; the seed, which is contained in the cup, is solitary, oblong, and crowned with a long hairy pap.

STOICS, a sect of antient philosophers, the followers of Zeno, thus called from the




The STOCKING-FRAME, and other Apparatus used in the Manufactory of STOCKINGS

T. Jefferys sculp.

the greek στοα, which signifies a porch or portico, in regard Zeno used to teach under a portico, or piazza. It was the common fault of the stoics to introduce abundance of subtilty and dryness into their disputations, either by word of mouth, or in writing. They seemed as carefully to avoid all beauty of stile, as depravity of morals. Chrysippus, who was one of the stoics, did no great honour to his sect, and could only disgrace it. He believed the gods perishable, and maintained, that they would actually perish in the general conflagration. He allowed the most notorious and most abominable incests, and admitted the community of wives amongst sages.

To the praise of the stoics in general, it must, however, be confessed, that, less intent than other philosophers upon frivolous and often dangerous speculations, they devoted their studies to the clearing up of those great principles of morality which were the firmest supports of society; but the dryness and stiffness that prevailed in their writings, as well as in their manners, disgusted most of their readers, and abundantly lessened their utility. Zeno's chief followers, among the Greeks, were Lucippus, Cleanthus, Chrysippus, Diogenes Babylonius, Antipater, Panætius, Possidonius, and Epictetus. Among the Romans, Cato, Varro, Cicero, Seneca, the emperor Antoninus, *&c.* The stoics cultivated logic, physics, metaphysics, *&c.* but especially ethics. The principal of their dogmata, of the former kinds, are, that there are certain catalepsias or comprehensions, called also κοινας εννοιας, innate ideas or principles, naturally found in the mind; that God is the seminal cause of the universe, and with the Platonists, that the world is an animal, by reason of God's inhabiting and informing every part thereof; that nature is an artificial fire tending to generation; and that the world is at last to be destroyed by a conflagration. As for the morality of the stoics, it was couched much in paradoxes; as that a wise man is void of all passions, or perturbation of mind; that pain is no real evil, but that a wise man is happy in the midst of torture, is always the same, and is always joyful; that there is none else free; that none else ought to be esteemed king, magistrate, poet, or philosopher; that all wise men are great men; that they are the only friends or lovers; that nothing can happen to them beyond their expectations; that all virtues are insensibly connected together; that all good things are equal, and equally to be desired; that goodness admits of no increase or diminution. They own but one God, whom they however, call by various names, as Fate, Jupiter, *&c.* by which they did not mean various things, but various powers and relations of the same thing. Providence they expressed under the name Fate, which Chrysippus defines to be a natural series, or composition of things mutually following each other, by an immutable nexus, or tie, fixed from all eternity. They held the immortality of the soul.

STOKEGOMER, a market-town of Somersetshire, situated twenty-two miles west of Wells.

STOKESLY, a market-town of Yorkshire, situated 30 miles north of York.

STOLBERG, a town of Germany, in the circle of Upper Saxony, and territory of Thuringia, fifty-eight miles north-west of Leipsic.

STOLE, *stola*, a sacerdotal ornament wore by the romish parish-priests over their surplice, as a mark of superiority in their respective churches; and by other priests, over the alb, at celebrating of mass, in which case it goes a-cross the stomach; and by deacons, over the left shoulder, scarf-wise; when the priest reads the gospel for any one, he lays the bottom of his stole on his head. The stole is a broad swath, or slip of stuff hanging from the neck to the feet, with three crosses thereon. The bishops antiently pretended, that the parish-priests were never to appear before them, but in their stole. In Flanders and Italy, they always preach in stoles; it is supposed to be a representation of the extremities of the long robe, wore by the high-priest of the Jews.

*Groom of the* STOLE, the eldest gentleman of his majesty's bed chamber, whose office and honour it is to present and put on his majesty's first garment, or shirt, every morning, and to order the things in the chamber. See BED-CHAMBER.

*Order of the* STOLE, an order of knights instituted by the kings of Arragon. Another military order, at Venice, is called the order of the golden stole; thus called from a golden stole, which those knights wore over their shoulder, reaching to the knee, both before and behind, a palm and a half broad. None are raised

raifed to this order but patricians, or noble Venetians. It is uncertain when either of thefe orders was inftituted.

STOLPE, a town of Germany, in the circle of Upper Saxony, and dutchy of Pomerania, fituated on a river of the fame name: eaft long. 17°, north lat. 54° 36′.

STOMACH, ϛόμαχ☉, in anatomy, is a hollow membraneous part, placed moftly in the left hypocondrium, immediately under the diaphragm, and in an oblique fituation, between the liver and the fpleen. Its figure, as may be feen in our figure and defcription of the inteftines, is like that of the bag of a pair of bag pipes. Its divifion is into two parts, *viz.* into two orifices and a bottom. Its left orifice, called cardia, is placed much higher than its right, and is continuous with the gula, and furnifhed with a great number of nerves. Its right orifice is called the pylorus, and is connected with, or opens into, the inteftines. In this part there is a fingular valve, the office of which is, to clofe the ftomach. The pylorus is connected to the upper part of the ftomach by a ligament. See HYPOCHONDRIA, DIAPHRAGM, *&c.*

The fize of the ftomach in human fubjects is various; in people addicted to gluttony, it is ufually very large; and in men it is in general larger than in women. In the human body it is always fingle, but many of the beafts have feveral ftomachs. Its veffels are arteries, veins, nerves, and lymphatics. Its arteries, called gaftricæ, it receives from the coeliac: the gaftric veins all run to the vena portæ; among thefe are obfervable, the vafa brevia, which go off to the fplenic branch, and the vena coronaria, which furrounds the ftomach. Its nerves principally enter at the left orifice; they come from the par vagum, and are very large, and hence it is, that the ftomach is fo fenfible: the lymphatics go to the receptaculum chyli. The fubftance of the ftomach is membranaceous, and is compofed of four coats. The firft coat is membranaceous, in the ftrict fenfe of the term: the fibres of this run tranfverfely. The fecond is mufculous; in this the courfe of the fibres is various, and as it were inextricable. Some of them run circularly, as it were, from the upper part to the lower; and others only on the upper part of the ftomach, between the two orifices; others run obliquely from the left fide to the right, and fome furround the orifice. The third coat of the ftomach is nervous; this forms a multitude of wrinkles, and is furnifhed with a number of fanguiferous veffels, and fmall glands, which fecrete the liquor gaftricus, or liquor of the ftomach; this is more readily obferved in hogs, than in the human body. The fourth is a thin, villofe, and porous coat, and adheres very firmly to the former.

The ufe of the ftomach is for the digeftion of our food, that is, to receive, contain, diffolve, and change what is fwallowed by the mouth; and after a fufficient concoction, to expel it through the pylorus into the inteftines; poffibly it alfo abforbs, and retains the moft fubtle parts of what it has thus prepared for nutrition. It alfo is the organ on which the fenfation of hunger refides.

For the action of the ftomach in turning the aliments into chyle, fee the article CHYLIFICATION.

For an inflammation of the ftomach, fee the article INFLAMMATION.

*Heat of the* STOMACH. See SODA.

*Heart-burn, or pain in the* STOMACH. See the article CARDIALGIA.

STOMACH-BRUSH, *Excutia Ventriculi.* See the article EXCUTIA VENTRICULI.

STOMACHIA FEBRIS, the STOMACHIC FEVER, a name given by Heifter, and others, to a fpecies of fever, called by others, a mefenteric fever. See the article MESENTERIC FEVER.

STOMACHIC, in pharmacy, medicines that ftrengthen the ftomach, and promote digeftion, *&c.* See DIGESTION.

Stomachic corroboratives are fuch as ftrengthen the tone of the ftomach and inteftines, among which are carminatives, as the roots of galangals, red gentian, zedoary, pimpinella, calamus aromaticus, and arum. Of barks and rinds, thofe of canella alba, faffafras, citrons, feville and china oranges, *&c.* Of fpices, pepper, ginger, cloves, cinnamon, cardamums, and mace. Other things of this nature are, among fimples, roman and common chamæmile, wormwood, mint, carduus benedictus, and the four carminative feeds. Of preparations, the oil of cedar, oil of oranges by expreffion, oils of common chamæmile, daucus creticus, anifum ftellatum, cumin, caraway, mint, and wormwood, with the fpirit of falt and fweet nitre. Among compounds, are the fal volatile fylvii, the ftomachic elixir, the effence of orange-peel, with fweet fpirit of nitre, tincture

tincture of tartar, oils of oranges prepared by expreſſion, the compound eſſence of wormwood, &c.

STOMACHIC, is alſo applied to the arteries, veins, &c. of the ſtomach. See the article STOMACH.

STOMACHUS, in anatomy, the ſame with the oeſophagus, or gula. See the article OESOPHAGUS.

STOMATIA, in natural hiſtory, a genus of ſimple ſhells, without any hinge, and formed of one piece; its figure is depreſſed and flat, its mouth the moſt patent of all the ſhells, the limpet only excepted; it has a ſhort ſpiral turn running into the mouth, at the head; and has no perforations in any part of the ſurface. The animal inhabiting this ſhell is a nereis.

STOMATICA, a term uſed by ſome for all medicines uſed in diſorders of the mouth and fauces.

STONES, in natural hiſtory, are defined to be eſſentially compound foſſils, not inflammable, nor ſoluble in water or oil, nor at all ductile; found in continued ſtrata, or beds, of great extent; formed either of a congeries of ſmall particles, in ſome degree reſembling ſand, and lodged in a ſmoother cementitious matter, or elſe of this cementitious matter, and the gritt or ſand-like particles, running together into one ſmooth maſs; or, finally, of granules cohering by contact, without any cementitious matter among them; or compoſed of cryſtal or ſpar, uſually debaſed by earth, and often mixed with talc, and other extraneous particles. See the articles SAND, CRYSTAL, SPAR, TALC, &c.

Of this claſs of foſſils there are three orders; and under theſe, eight genera.

The firſt order comprehends all the coarſe harſh, and rough ſtones, of a lax texture, and compoſed of a viſible gritt, reſembling ſand in form, and uſually immerſed in a cementitious matter, and of little natural brightneſs; ſcarce capable of any poliſh, and naturally mouldering away in form of powder from the tools of the workmen. The genera of this order are two, *viz.* the ammochiſta and pſaduria; the former of which conſtitute our grey and rough ſlates, and the latter comprehends moſt of the ſtones uſed in building, particularly portland ſtone. See the articles SLATE and PORTLAND STONE.

The ſecond order conſiſts of ſtones, moderately fine, of a more compact and even texture, ſcarce diſtinguiſhable conſtruction, and affording no ſand-like particles to the view; of ſome natural brightneſs, capable of a tolerable poliſh, and flying off from the tools of the workmen in form of ſmall chips. Under this order are comprehended the ſympexia and ſtegania. See the articles SYMPEXIUM and STEGANIUM.

The third order conſiſts of ſtones, of a very fine ſubſtance and elegant ſtructure, naturally of a great brightneſs, and capable of an elegant poliſh; compoſed of granules of various ſhapes and ſizes, but uſually flattiſh, ſometimes more, ſometimes leſs diſtinct; and, in ſome ſpecies, running together into uniform maſſes, but never lodged in any cementitious ſubſtance. Of this order are the marbles, alabaſters, porphyries, and granites. See the articles MARBLE, ALABASTER, PORPHYRY, and GRANITE.

For *the formation of* STONES, ſee the article LITHOGENESIA.

*Pudding* STONE, *lithozugia.* See the article LITHOZUGIA.

*Figured or formed* STONES, among naturaliſts, ſtones found in the ſhape of ſhells, or other parts of animals.

There are two very different opinions concerning the origin of theſe ſtones, which have occaſioned great diſputes among the learned. One is, that theſe bodies, though reſembling ever ſo exactly the ſea-fiſhes, yet never were in the ſea at all; but that the firſt ſemina of the ſea-ſhells, corals, and other ſubſtances, being carried by the ſea-water through the ſubterranean paſſages into all parts of the earth, even into the higheſt mountains, have been there left in vaſt numbers, and growing there among ſtony matter, have arrived at their true bulk and figure, but in a ſtony ſubſtance. But the other opinion ſeems to be a true one, which declares them to be all of marine origin at firſt, and that they were brought to the places where we find them in this foſſile ſtate, at the time of the univerſal deluge, and have been ſince altered into the nature of ſtones, by long lying in the earth in the way of waters impregnated with ſtony particles, which they have depoſited in them, after entering their ſubſtance in their paſſage through the earth. See the article SHELL.

As to the petrified teeth of animals, called by authors lycodontes, gloſſopetræ, &c. See the articles LYCODONTES, GLOSSOPETRA, &c.

STONE, *lithiasis* and *calculus humanus*, in medicine, a stony or terrestrial concretion in any of the urinary passages, which occasions a difficulty in making water, and a pain in the small of the back, or about the os pubis. When this collection is so large as to form one or more bodies, unable by reason of their size to pass through the conduits of urine, they frequently cause great pain, ulcers in the parts, and an intire suppression of urine; and, from the part where this obstructing matter happens to lodge, this distemper receives its denomination, as from the kidneys, bladder, ureters, or urethra.

This disorder, says Dr. Shaw, may sometimes have an hereditary cause; that is, the urinary passages may be naturally straighter than they ought to be; or the constitution may be naturally disposed to generate a stony matter; an obstructed perspiration, and a cold or moist air, may also give rise to it; for by means hereof the more heavy particles of the animal fluids will be detained in the body.

Another occasion of this distemper may be the use of such waters, as by running through various strata of the earth, are impregnated with stony particles. There are some wines too, and other liquors, which being either foul or not sufficiently fined down, or abounding in tartar, or other terrestrial corpuscles, may lay the foundation for the stone. Again, in persons subject to the asthma or gout, who have a weak digestion, viscid chyle, and stony concretions in the joints, there are manifest seeds of this distemper. In short, whatever can bring on an accumulation of earthy particles in the urinary passages, whether by obstructing or lessening the capacity of the canals, or by immediately or remotely producing the substance itself, will cause gravel, and in time the stone.

The symptoms of the gravel or stone are, frequently, a nausea and vomiting, with a numbness down the leg and thigh of the part affected; a pain fixed or moveable, great or less, in proportion to the bulk of impacted matter felt generally about the region of the loins, os pubis, and parts adjacent. This pain is very acute, and almost continual, when the gravel or stone remains at the head of the ureters; but begins to lessen, as it is protruded forwards. Sometimes when the stone is angular, or continues long fixed, the urine is bloody; and, generally in nephritic obstructions, it is thin, and made in a small quantity, especially at the beginning of the fit. Sometimes there happens a total suppression of it, in which case both the ureters may be obstructed. See ISCHURY.

When the obstructed matter is forced into the bladder, the urine is turbid, and comes away plentifully; and there appears in it much sand, and sometimes small stones; which when angular, are seldom voided without much pain: and when the paroxysm is violent, and of long continuance, there sometimes happens an entire suppression of stool so far, that cathartics lose their force; and sometimes too, though rarely, the terrestrial matter is deposited in such parts where the canals are lax and the circulation languid, so as at the same time to occasion both an arthritic and a nephritic fit. When a stone is lodged in the urethra, the pain generally proves exquisite, but limited to the part, where sometimes the stone will bulge outwards, and may be felt with the fingers.

All paroxysms in case of a confirmed stone, are dangerous. An accumulation of sand in the kidneys or ureters, is less dangerous than a formed stone. A stone in the kidneys is of worse consequence than in the ureters, and more or less so in proportion to its bigness. The largest stone, naturally capable of passing the urethra in men, is supposed to be about the size of a small hazel nut; but in women, one considerably larger may pass the meatus urinarius. When both kidneys, or both ureters, are affected, it is so much the more dangerous, especially if attended with sharp pain, exulceration, inflammation, want of sleep, loss of strength, a fever, suppression of urine, &c. When the symptoms continue many days without intermission, the case is desperate; especially if coldness has seized the extremities, the pulse ticks, and the patient has cold sweats, &c. When the case is habitual or hereditary, or happens in old age or gouty constitutions, it is difficult. The symptoms of bloody urine, continuing after the fit is gone off, prove hard to remove. When the urine is plentifully discharged, has its ordinary sediment, is turbid, and the symptoms decrease, it is a sign the paroxysm is going off. If a large stone be long detained in the urethra, especially if it be rugged, and can neither be propelled backwards nor forwards, and there be a total sup-

ſuppreſſion of urine, the caſe uſually proves mortal.

As to the method of cure, it conſiſts in the eaſy excluſion of the ſtone, and the preventing the breeding of others. To this purpoſe, Sydenham recommends bleeding, a poſſet drink, in which two ounces of marſh-mallow roots have been boiled, and an emollient clyſter; after which, he adviſes a pretty large doſe of an opiate; that is, about twenty-five drops of the thebaic tincture, or fifteen grains of the ſaponaceous pills. And Huxham tells us, that nothing is ſo efficacious to eaſe the pain, and promote the deſcent of the ſtone through the ureters, as a tepid and emollient bath. Dr. Mead aſſures us, that it is an error in practice, to give ſtrong forcing diuretics, with a view of driving out the gravel with the urine: whereas this intention is anſwered with greater ſafety, in moſt caſes, by relaxing and lubricating medicines; eſpecially if, in caſe of violent pain, bleeding be premiſed, and anodynes interſperſed. He therefore adviſes, to give three or four grains of opium, diſſolved in five or ſix ounces of the common decoction, by way of clyſter. However, he allows, there are conjunctures, after the pain is abated, when powerful diuretics may be adminiſtered; but with this precaution, that as ſoon as they have had their effect, they are no longer to be continued. All this time the body ſhould be kept open, by giving a turpentine clyſter, and ſometimes purging gently with an infuſion of ſena and manna, becauſe ſtrong cathartics are to be avoided. The chief lubricating medicines are oil of ſweet almonds, ſyrup of marſhmallows, emulſions made with almonds, and the like; to which may be added the uſe of the warm bath. Soap and lime-water are alſo celebrated lithontriptics. See the articles SOAP, LIME, and LITHONTRIPTICS.

Such as have a ſtone in the bladder, ſhould, while they are taking the foreſaid medicines, have four ounces or upwards of tepid oyſter-ſhell lime water injected into the bladder every day; taking care to evacuate their urine before injection, and to retain it as long as they can without pain. And were it not for the trouble of introducing the catheter, the injection might be made at leaſt twice every day; and if a flexible catheter were always kept in the bladder, it might be done at pleaſure, and the diſſolution of the largeſt ſtone quickly procured. The lime-water will be ſafer, and yet loſe nothing of its virtue, if a dram of ſtarch, or the fourth part of the yolk of an egg, be boiled in ſix or ſeven ounces of it.

Thoſe who, though they have no ſtone in the bladder, are nevertheleſs frequently troubled with fits of the gravel in the kidneys, may probably put a ſtop to the diſorder, by drinking every morning a pint of oyſter-ſhell lime-water, two or three hours before breakfaſt. Its diſagreeable taſte may be mitigated, by adding a very ſmall quantity of new-milk to it: alſo a dram and a half, or two drams, of juniper berries, infuſed in every quart-bottle of it, will mend its taſte much.

As to the regimen to be obſerved, Dr. Mead recommends a mild diet, and ſuch as is eaſy of digeſtion; and wine and water, mead, or new ſoft ale, for drink; and gentle exerciſe, eſpecially riding. See the articles DIET and REGIMEN.

For the ſeveral operations in cutting for the ſtone, or the method of cure by extraction, ſee the article LITHOTOMY.

STONE alſo denotes a certain quantity or weight of ſome commodities. See the article WEIGHT.

A ſtone of beef, at London, is the quantity of eight pounds; in Herefordſhire, twelve pounds; in the north, ſixteen pounds.

A ſtone of wool (according to the ſtatute of 11 Hen. VII.) is to weigh fourteen pounds; yet in ſome places it is more, in others leſs; as in Glouceſterſhire, fifteen pounds; in Herefordſhire, twelve pounds.

A ſtone, among horſe-courſers, is the weight of fourteen pounds.

STONE, in geography, a market-town, ſeven miles north of Stafford.

STONE-BLUE, the ſame with ſmalt. See the article SMALT.

STONE-CHATTER, in ornithology, the engliſh name of the black motacilla, with a yellow throat and white belly: it is about the ſize of a linnet, and has a remarkable white ſpot on each ſide. See the article MOTACILLA.

STONEHENGE, in antiquity, a famed pile or monument of huge ſtones on Saliſbury plain, ſix miles diſtant from that city.

It conſiſts of the remains of four ranks of rough ſtones, ranged one within another, ſome of them, eſpecially in the outer-

outermoſt and third rank, twenty feet high, and ſeven broad; ſuſtaining others laid acroſs their heads and faſtened by mortiſes: ſo that the whole muſt have antiently hung together.

Antiquaries are now pretty well agreed that it was a britiſh temple; and Dr. Langwith thinks it might eaſily be made probable, at leaſt, that it was dedicated to the ſun and moon. Inigo Jones has given a fine ſcheme of the work, and ſtrives hard to perſuade the world, that it was Roman: but Dr. Langwith, who took his meaſures on the ſpot, aſſures us he could by no means reconcile them with that ſcheme.

STONY LANDS, in agriculture, ſuch as are full of flints, pebbles, or ſmall fragments of free-ſtone.

Theſe lands, in many places, yield good crops; and the general rule is, that, in cold and ſtiff lands, the ſtones ſhould be carefully removed; but, in light and dry lands, it will be advantageous to leave them. However, they always fallow theſe lands every other year, unleſs they ſow peaſe upon them; ſometimes they ſow them with lentils; and when they are quite worn out, they lay them down for clover, or rye-graſs.

STONEY-STRATFORD, a market-town of Buckinghamſhire, fourteen miles north of Aileſbury.

STOOL, *alvus*, in medicine, an evacuation or diſcharge of the fæces, *&c.* by the anus.

Spirit of vitriol, mixed with the patient's drink, is ſaid to be an excellent medicine in caſe of bloody ſtools. See the article DYSENTERY.

STOOL is alſo a kind of ſeat, without a back, much uſed by artificers, *&c.* and, among ſeamen, the reſts whereon the poop and top-lanterns ſtand, are called ſtools.

STOOMING *of wine*, is the putting bags of herbs, or other ingredients, into it. See the article WINE.

STOOPING, in falconry, is when a hawk being upon the wing, at the height of her pitch, bends down violently to take the fowl. See the articles FALCONRY and HAWKING.

STOP, in the manege, is a pauſe, or diſcontinuance of a horſe's motion.

To form a ſtop, you muſt, in the firſt place, bring to the calves of your legs to animate him, bend your body backwards, raiſe the bridle-hand without moving the elbow, then vigorouſly extend your hams, and reſt upon your ſtirrups, and make him form the times or motions of his ſtop, in falcading his haunches three or four times. After ſtopping your horſe, make him give three or four curvets. The oppoſite term of ſtop, is parting. In former times, the ſtop of a horſe was called parade.

Half a ſtop, is a ſtop not finiſhed, but a peſate; ſo that the horſe, after falcading three or four times upon the haunches, reſumes and continues his gallop, without making peſades or curvets.

STOPS, or POINTS, in grammar. See the articles POINT and PUNCTUATION.

STOPPER, in a ſhip, a piece of cable-laid rope, having a wale-knot at one end, with a laniard faſtened to it; and the other end is ſpliced round a thimble in the ring-bolts upon deck, and at the bits: its uſe is to ſtop the cable, that it may not run out too faſt; in order to which, they make turns with the laniard about the cable, and the wale-knot ſtops it, ſo that it cannot ſlip away faſter than is neceſſary.

STORAX, or STYRAX, in natural hiſtory and pharmacy, a dry and ſolid reſin, of a reddiſh colour, and a peculiarly fragrant ſmell, of which there are two kinds, the ſtyrax calamita, or ſtyrax in tears, and the ſtyrax vulgaris, whereof the former is by far the purer and finer kind, imported in ſmall looſe granules, or elſe in large maſſes compoſed of ſuch granules: it antiently uſed to be packed up in reeds, for the more ſecure carriage; whence the name. The common ſtorax is likewiſe a fine and pure reſin, though leſs ſo than the former; and is brought to us in large lumps, not formed of granules, but of one uniform conſiſtence.

Theſe are the two genuine kinds of ſtorax; but neither of them is that met with in our ſhops, which is a kind of ſawduſt connected into lumps, by juſt ſo much of the ſtorax-reſin as will make the other matters hang together. This is what our apothecaries uſe, under the name of ſtorax; but it is adviſeable, to ſtrain carefully the pure reſin from the filth, and uſe no part of the latter.

The two genuine kinds of ſtorax, which ought always to be uſed where they can be had, differ only in this; that the granulated ſtorax flows naturally from the ſtyrax-tree, and the common kind is obtained from the ſame tree, by inciſion. See the article STYRAX.

Storax is brought to us from Syria, and the Eaſt Indies; and ought to be choſen

pure,

pure, very fragrant, and of an acid tafte. It is much recommended as a detergent and balfamic, in diforders of the breaft: it is alfo efteemed a cordial, and is recommended in vertigos, and other diforders of the head and nerves.

On importation, the ftorax calamita pays a duty of 11 $\frac{62\frac{1}{2}}{100}$d. the pound; and draws back, on exportation, 10$\frac{20}{100}$d.

*Liquid* STORAX, in pharmacy, is a drug very different from the refin above defcribed; being a refinous juice, of the confiftence of venice-turpentine, or thicker: it is, when clean, pellucid, of a brownifh colour, with a caft fometimes of reddifh, and fometimes of greyifh in it. Its fmell is fomewhat like that of common ftorax, only much ftronger, and even difagreeable: its tafte is acrid, aromatic, and fomewhat bitterifh; and it is oily, or unctuous. It fhould be chofen thin, pellucid, of a clean brown colour, and of a very ftrong fmell.

There is another coarfer and very impure kind, not at all pellucid, and of a grey or brownifh colour: its fmell is much more languid, and alfo more difagreeable than that of the pure kind; whereof it feems to be only the dregs, though it is by much the moft common liquid ftorax in the fhops.

Petiver gives the moft rational account of the origin of liquid ftorax; which, he fays, is prepared from the bark of a tree, called by the Turks rofa mallos, which is frequent in the ifland Cobras. The bark of this tree being bruifed and macerated in fea-water, is boiled to the confiftence of bird-lime; they then collect the refinous matter that fwims on the top; which, being foul, is boiled again in fea-water, and ftrained: what paffes the bags is the finer, and what remains in them the coarfer liquid ftorax. He adds, that liquid ftorax is much efteemed in the eaft, as a perfume. As to its medicinal virtues, they are nearly related to thofe of turpentine: it is prefcribed, internally, as a detergent and diuretic; and externally, to prevent mortifications. The French fpeak much of the virtues of the ointment called unguentum de ftyrace, which is thus prepared: melt in five ounces of nut-oil, gum-elemi and yellow wax, of each three ounces and three drams; add of colophony, feven ounces and a half: and when all thefe are perfectly melted together, add three ounces and three drams of pure liquid ftorax; and let the whole be well mixed, and then cool.

STORGE, στοργη, a greek term, frequently ufed for the parental inftinct, or natural affection, which almoft all animals bear their young; whereby they are moft powerfully moved to defend them from dangers, and procure for them fuitable nourifhment.

STORK, *ciconia*, in ornithology, a fpecies of ardea, with the long wing-feathers black: its general colour is white, which with the black wing feathers makes a very pleafing variegation: the legs are red, very long, and naked a great way up: when it ftands erect, it is between three and four feet high; and its body is about the fize of a goofe.

But befides the common ftork, there are two other fpecies of ardea known by the fame name, *viz.* the black ftork, with the breaft and belly white, an erect and beautiful bird, fomewhat larger than the common heron; and the brafilian ftork, variegated with black and white, much about the fize of the common heron. See the articles ARDEA and HERON.

STORM-BIRD, or STORM-FISH, *procellaria*, in ornithology. See the article PROCELLARIA.

STORMAR, the fouth divifion of Holftein, whereof Hamburgh is the chief town.

STORTFORD, a market-town of Hertfordfhire, thirty miles north of London.

STOVES, in gardening, are buildings erected for the prefervation of tender exotic plants, which, without that affiftance, will not bear the cold of our winter, becaufe they require an artificial warmth.

Stoves are of two kinds, diftinguifhed by the names of the dry and the bark-ftoves.

The dry ftove has the flues, in which the fmoak is carried, either laid under the pavement of the floor, or erected in the back part of the houfe over each other, and returned fix or eight times all along the ftove. In thefe ftoves the plants are placed on fcaffolds, and benches of boards, raifed above one another; and the plants, principally preferved in thefe, are the aloes, cereufes, euphorbiums, tithymals, and other fucculent plants, which are impatient of moifture in winter, and therefore are not to be kept among trees, or herbaceous plants, which perfpire freely.

The bark-ftoves are made with a large pit, nearly of the length of the houfe, which

which is three feet deep, and six or seven feet wide. This pit is to be filled with fresh tanner's bark to make a hot-bed, and in this the pots, containing the tender plants, are to be plunged.

This invention of tanner's bark for hot-beds, has been of prodigious service to the curious in gardening, as many plants are, by this means, annually preserved and raised, which no other method could have made endure our climate.

The dimensions of these stoves must be wholly directed by the number of plants intended to be preserved; and for the dry stove, the floor must be raised above the surface of the earth, more or less, according to the driness or wetness of the soil. In the front there is to be a walk about twenty inches wide, for the convenience of walking. The fire-place may be made either in the middle, or at one end, and the furnace must be contrived according to the nature of the fuel which is to be burnt there. The best firing, when it can be had, is turf, for it burns longer, and more moderately, than any other fuel, as also more uniformly, and therefore requires less attendance.

The entrance into the bark-stove should always be either out of a green-house, or the dry stove, or else through the shed where the fire is made; because in cold weather the front glasses must not, by any means, be opened; and the top should be covered either with tarpaulins, or sliding shutters, in bad weather.

The tender shrubs and exotic plants must be plunged in their pots into the bark-beds; such are the cashew, cabbage-tree, cocoa tree, dumb-cane, fustick, logwood, mancinel, papaw-tree, four sop, and the like; and upon the top of the flues may be set the melon, thistle, the tender cereuses, and the like.

The thermometer, by which the heat in the stove is regulated, must always be hung with its back to the sun, and as far from the flues as may be. The proper structure of these shelters, for the curious part of the vegetable creation, is to have a green-house in the middle, and two stoves, and a glass case, at each end. See the article GREEN-HOUSE.

STOVE, among confectioners, denotes a little closet, well enclosed on all sides; wherein they dry their sweet-meats, ranged on several rows of shelves, made of wires.

STOUR, the name of several small rivers, in England.

STOURBRIDGE, or STURBRIDGE, a market-town, nineteen miles north of Worcester.

STOURBRIDGE is also the name of a field, near Cambridge, where Sturbridge-fair is kept yearly, on September 7, and continues a fortnight.

STOW, a market-town, twenty miles east of Glocester.

STOWAGE, in the sea-language, the placing goods orderly in the hold of a ship, *viz.* the heaviest next the ballast, &c.

STOWEY, a market-town of Somersetshire, eighteen miles west of Wells.

STOW-MARKET, a town of Suffolk, ten miles east of Bury.

STRABISMUS, στραβισμὸς, SQUINTING, in medicine and surgery, a distortion of the eyes, whereby their pupils are turned from, instead of being directed towards, objects at which they look: sometimes only one eye, but more frequently both are thus affected.

This disorder is frequently caused in infants, from letting them constantly suck at one and the same breast; or from placing them in the cradle, so as that they always look the same way towards the light or window; by which repeated action, the muscles on that side become too strong to be balanced by their opposite muscles; and hence the eye is contorted, or looks obliquely at objects. But it may be also owing to convulsive and epileptic motions, to which the eyes of infants are extremely subject. And, lastly, it may proceed, as well in adults as infants, from a spasm, or rigor, or from a palsy in some of the muscles of the eye; as also from a defect, or insensibility, of some part of the retina.

Squinting is a disorder very difficult to be cured, especially when in adults, and caused by some defect in the muscles, or retina: but, in young infants, it may probably be cured, says St. Yves, by frequently placing them before a looking-glass, that their eyes may be directed towards the image of their own face. Those more advanced in years may be assisted by reading very small writing or print; or by inspecting very minute objects, provided they turn their eyes even, and bathe them at times with hungary-water. Others propose to cure this disorder with a sort of mask, or eye-swath, represented in plate CCLXII. fig. 2. But this method is seldom practicable, through the moroseness of infants, and other impediments.

STRADELLA, a town of the dutchy of Milan, in Italy, situated on the south side of the river Po, fourteen miles south-east of Pavia.

STRAIGHT, STREIGHT, or STRAIT, in hydrography. See the article STRAIT.

STRAIN, in surgery, a violent extension of the sinews, or tendons, of some muscle.

STRAIT, or STREIGHT, in hydrography, is a narrow passage out of one sea into another, as those of Gibraltar and Magellan.

STRAKES, in the sea-language, signify the uniform ranges of planks on the bottom, decks, and sides of ships; and the garboard-strake is that next the keel.

STRALSUND, a strong city and port-town of Germany, in the circle of Upper Saxony and dutchy of Pomerania, subject to Sweden: east longitude 13° 22′, and north latitude 54° 23′.

STRAND, signifies any shore of the sea, or bank of a great river: hence an immunity from paying customs on goods or vessels, was antiently expressed by strand and stream.

STRANDED, among seamen, is said of a ship that is driven ashore by a tempest, or runs on ground through ill steerage, and so perishes.

Where any vessel is stranded, the justices of the peace are impowered to command the constables near the sea-coast to call assistance, in order to preserve the same, if possible.

STRANGER, in law, signifies a person who is not privy to some act: thus, a stranger to a deed, is any person who has nothing to do therewith; in which sense it is opposed to party or privy.

STRANGFORD, a town of Ireland, that gives name to a lough and bay, in the county of Down and province of Ulster, situated nine miles east of Down.

STRANGURY, in medicine, a difficulty of making water, wherein the urine comes away drop by drop, and is attended with a spasmodic pain about the sphincter and neck of the bladder; in which sense it is distinguished from a dysury and ischury. See the articles DYSURY and ISCHURY.

As to the treatment, in order to obtund the acrimony of the blood, and take off the spastic motions, there is no medicine so useful as nitre, whether given alone, or mixed with some absterfive salt, or with an absorbent, mixed with a small quantity of an acid to saturate it, and with a little cinnabar. A compound powder may be prepared of these ingredients, and a scruple of it given four times a day, will usually soon take off the complaint. The cooling emulsions, made with barley-water and almonds, and with the cold seeds, are also of great service: and when there is farther occasion for medicines, gum arabic, and pills of boiled turpentine, are found very good ones; and decoctions of liquorice roots in barley-water, with syrup of marsh-mallows, may be drank in large draughts. Many people are also fond of external remedies, and recommend onions, roasted and buttered, to be applied to the pubes, and goat's suet to be rubbed warm about the navel.

A common strangury is often carried off by mere diluters, such as tea, barley-water, or any other watery liquor, drank in large quantities, till a sweat comes on; and in the gentler cases, where these alone are not quite effectual, there is no better addition to them than a little nitre. Bleeding in time often prevents great mischiefs from these disorders; and in cases of a dysury, brought on by the taking cantharides, there is no remedy so powerful as warm milk alone, drank in large quantities. Mr. Boyle has also said much in favour of venice-soap on this occasion.

STRANRAVER, a parliament-town of Scotland, situated in the shire of Galloway, on a bay of the frith of Clyde.

STRAP, among surgeons, a strong piece of leather, or the like, used for stretching limbs, in the setting broken or dislocated bones. See the articles DISLOCATION, LUXATION, HUMERUS, &c.

STRAPS *of a saddle*, are strong leather-thongs, nailed to the bows of a saddle, in order to make the girths, &c. fast. See the article SADDLE.

STRAP, in a ship, is a rope spliced about any block, or made with an eye, to fasten it any where, on occasion.

STRAPADO, or STRAPPADO, a kind of military punishment, wherein the criminal is hoisted up by a rope, and let down, so that, by the weight of his body in the fall, his arms are dislocated.

STRASBURG, a free imperial city of Germany, capital of the landgraviate of Alsace, situated near the western bank of the Rhine, in east longitude 7° 35′, and north latitude 48° 38′.

STRATA, in natural history, the seve-

ral beds or layers of different matters, whereof the body of the earth is compoſed.

The ſtrata include all the layers of earths, minerals, metals, ſtones, &c. lying under the upper tegument, or ſtratum, the turf or mould.

The time when theſe ſeveral ſtrata were laid, was doubtleſs at the creation; unleſs, with ſome great naturaliſts, as Steno, Dr. Woodward, &c. we ſuppoſe the globe of the earth to have been diſſolved by the deluge. See Deluge.

The moſt frequent opportunities we have of obſerving theſe in England, is in the coal-miles; where we find them lying in a regular manner, on what appears to us a plane, as we ſee any ſmall part of it: but when we conſider the ſame ſtrata, according to the globular figure of the earth, and ſuppoſe the maſs of the earth to conſiſt of the foregoing, and perhaps in different parts, and at different depths, of ſtrata of ten thouſand other kinds, all originally, while in a ſoft and fluid ſtate, tending towards the center, we ſhall find that it muſt mechanically and almoſt neceſſarily follow, by the continual revolution of the crude maſs from weſt to Eaſt, like the winding up of a jack, or the rolling up of the leaves of a paper-book, that every one of theſe ſtrata, though they each reach the center, muſt, in ſome place or other, appear to the day, or on the ſurface. In which caſe there needs no ſpecific gravitation to cauſe the lighteſt to be uppermoſt; and were it practicable to ſink to the center of the earth, all the ſtrata that are would be found in every part, and, according to the poet, *ponderibus librata ſuis*. Add to this, that according to an obſervation of Dr. Stukely, the precipices of all hills are to the weſtward, whereas the aſcent to the eaſt is more gradual.

STRATAGEM, or Strategem, in the art of war, any device for the deceiving and ſurpriſing an enemy.

STRATEGUS, in grecian antiquity, an annual officer among the Athenians, whereof there were two choſen, to command the troops of the ſtate.

STRATFORD, a market-town, ſituated ſix miles ſouth of Warwick.

STRATHNAVER, a ſubdiviſion or diſtrict of the county of Sutherland, in Scotland, having the Caledonian ocean on the north and weſt.

STRATIFICATION, in chemiſtry, the ranging any thing to be calcined in ſeveral layers or ſtrata one above above another; which operation is denoted by the abbreviation *ſ. ſ. ſ.*

STRATIOTES, the fresh-water-soldier, in botany, a genus of the polyandria-hexagynia claſs of plants, the flower of which conſiſts of three obverſely cordated erecto-patent petals; the fruit is an oval berry, attenuated at each end, and covered with the cup; it conſiſts of ſix cells, and contains numerous, oblong, orooked, and, as it were, alated ſeeds.

STRATTON, a market-town of Cornwal, ſituated a little ſouth of the Briſtol channel, fourteen miles north-weſt of Launceſton.

STRAUBING, a city of Bavaria, ſituated on the Danube, twenty miles ſouth-eaſt of Ratiſbon.

STRAWBERRY, *fragaria*, in botany. See the article Fragaria.

Strawberry-leaves are ſomewhat ſtyptic and bitteriſh; and hence may be of ſome ſervice in debility and laxity in the viſcera, and immoderate ſecretions: they are alſo recommended in hæmorrhages and fluxes. The fruit is very grateful both to the palate and ſtomach, abating heat, quenching thirſt, looſening the belly, and promoting urine.

Strawberry-tree, *arbutus*, in botany. See the article Arbutus.

STRAY, or Estray, in law. See the article Estray.

STREAM-anchor. See Anchor.

STRENÆ, in antiquity, preſents made on new-year's day, as a happy augury for the enſuing year.

STRENGTH, *vis*, in phyſiology, the ſame with force. See Force and Power.

The ſtrengths of different animals of the ſame ſpecies, or of the ſame animal, at different times, are demonſtrated to be in a triplicate proportion of the quantities of the maſs of their blood; the whole ſtrength of an animal is the force of all the muſcles taken together; therefore, whatever increaſes ſtrength, increaſes the force of all the muſcles, and of thoſe ſerving digeſtion as well as others. See Muscle.

Notwithſtanding the ſtrengths of the ſame animal at different times, or of different animals of the ſame ſpecies, are in proportion to the quantities of the maſs of their blood, yet the quantity of the blood may be increaſed in ſuch circumſtances, as to abate the ſtrength. The equilibrium

um between the blood and the vessels being destroyed, wonderfully lessens the strength. The sudden suppression of perspiration, though it increases the quantity of the blood, as it most considerably does by Sanctorius's calculation, yet it lessens the strength, because the retained matter, being what ought to be evacuated, so alters the texture of the blood, as to make it unfit for muscular motion. See the article PERSPIRATION, &c.

Bellini proves, that if the blood be so vitiated, as to increase or diminish strength, it amounts to the same, as if the blood were in a natural state, but its quantity increased or diminished in the same proportion; so that the blood, when vitiated, may so impair the strength of the muscles, as even to spoil digestion; and yet, in some cases, it may be so vitiated, as to help digestion, and increase strength. See BLOOD, MUSCLE, &c.

M. de la Hire, in a calculation of the strength of a man in drawing and bearing, shews, that the strength of an ordinary man, walking in an horizontal direction, and with his body inclining forwards, is only equal to twenty-seven pounds, which is much less than one would have imagined. He adds, that this force would be much greater, if the man were to walk backwards; and that it is for this reason, the watermen fetch their oars from before backwards. It is known, by experience, that a horse draws horizontally as much as seven men, consequently his strength must be 189 pounds. A horse, as to pushing forwards, has a great advantage over a man, both in the strength of its muscles, and the disposition of its whole body; but the man has the advantage over the horse in ascending. M. de la Hire shews, that three men, laden with 100 pounds apiece, will ascend a pretty steep hill with more ease and expedition than a horse laden with 300 pounds.

Dr. Desaguliers shews, from a variety of experiments, that pretended feats of strength is wholly owing to art, and accounts for them as not exceeding the power of any man of moderate strength. See Desaguliers's Experimental Philosophy, vol. I. page 265, seq.

For the manner of calculating the strength of timber, see the article TIMBER.

For the strength of spirits, see the articles PROOF, BRANDY, &c.

STRENGTHENERS, in pharmacy, medicines that add to the bulk and firmness of the solids; and such are all absorbent, agglutinant, and astringent medicines. See the articles ABSORBENTS, AGGLUTINANTS, and ASTRINGENTS.

Medicines of this kind are of great service in hectics, consumptions, and the like disorders.

STRIÆ, in the antient architecture, the same with the flutings of columns. See the article FLUTES.

Among naturalists, the term striæ denotes the small channels and ridges in scollop-shells, &c.

STRIATED LEAF, among botanists, one that has a number of longitudinal furrows on its surface.

STRICTOR, in anatomy, the same with constrictor and sphincter. See the articles CONSTRICTOR and SPHINCTER.

STRIGONENSIS TERRA, *earth of Strigonium*, in the materia medica, a red earth, of the bole kind, found about the gold-mines at Strigonium in Hungary, and used in some places as an astringent and sudorific. See the article BOLE.

The characters by which it is known from the other earths are these: It is but of a coarse and impure texture, and lighter than most of the boles in colour; it is of a strong, but dull red, and is of a tolerably smooth surface; it is apt to crumble to pieces between the fingers, and stains the skin in handling; it melts freely in the mouth, and has a remarkable smoothness, but very little astringency in its taste, and leaves a sensible grittiness between the teeth; it is sometimes veined and spotted with small moleculæ of an earth, like the whitish variegations of the red french bole.

STRIKE, a measure of capacity, containing four bushels. See MEASURE.

STRIKE, among seamen, is a word variously used: when a ship, in a fight, or on meeting with a ship of war, lets down or lowers her top-sails, at least half-mast-high, they say she strikes, meaning she yields, or submits, or pays respect to the ship of war. Also, when a ship touches ground, in shoal-water, they say she strikes. And when a top-mast is to be taken down, the word of command is, strike the top-mast, &c.

STRING, or CHORD, in music. See the article CHORD.

STRIX, the OWL KIND, in ornithology, a kind of birds, with four toes on each foot; three of which stand forward, and the other backward.

To this genus belong the bubo, or great horned owl, the scops, &c. See the articles BUBO, SCOPS, &c.

STROBILUS, among botanifts, a kind of pericarpium, formed of a number of vaginæ, with contorted points applied clofe to one another. See Pericarpium.

STROMATEUS, in ichthyology, a genus of fifhes of the malacopterygious, or foft-finned, kind, the characters of which are thefe: the body is very much compreffed, and very broad and thin; it has no belly-fins, and has only one back-fin, which is extended over the whole back. The only known fpecies of this genus is the callichthys of authors, a fifh called the fiatola at Rome: the tail of which is very forked; the mouth is very fmall; the teeth are placed in the jaws and palate; and the tongue is fmooth and broad: the body is ftriped crofsways.

STROMBOLI, one of the Lipari-iflands, fifty miles north of Meffina.

STRONGOLI, a town of the hither Calabria, in the kingdom of Naples, fituated on the gulph of Taranto.

STROPHE, in antient poetry, a certain number of verfes, including a perfect fenfe, and making the firft part of an ode, See the article Ode.

STROUD, a market-town, nine miles fouth of Glocefter.

STRUMÆ, fcrophulous tumours arifing on the neck and throat, conftituting what is commonly called the king's evil. See the article Scrophula.

STRUTHIO, the ostrich, in ornithology. See the article Ostrich.

STRYCHNUS, in botany, a genus of the pentandria monogynia clafs of plants, with a monopetalous flower, quinquifid at the limb; its fruit is a very large and fmooth unilocular berry, full of a pulpy matter, and containing orbiculated feeds, with hairs radiated from their edges.

STRYMON, or Amphipolis. See the article Amphipolis.

STUC, or Stucco, in building, a compofition of white marble, pulverifed and mixed with plafter of lime; and the whole being fifted and wrought up with water, is to be ufed like common plafter: this is what Pliny means by marmoratum opus, and albarium opus.

STUFF, in commerce, a general name for all kinds of fabrics of gold, filver, filk, wool, hair, cotton, or thread, manufactured on the loom; of which number are velvets, brocades, mohairs, fattins, taffeties, cloths, ferges, &c. See the articles Velvet, Brocade, &c.

STULINGEN, a town of Swabia, in Germany, 35 miles weft of Conftance.

STUL-WEISSENBURG, a city of Lower Hungary, 36 miles fouth-weft of Buda.

STUM, in the wine-trade, denotes the unfermented juice of the grape, after it has been feveral times racked off, and feparated from its fediment. The cafks are, for this purpofe, well matched, or fumigated with brimftone every time, to prevent the liquor from fermenting, as it would otherwife readily do, and become wine. See the article Matching.

It is this fume of the fulphur from the match, that prevents, in this cafe, all tendency to fermentation, and continues the natural juice of the grape in a fweet ftate, fit to be readily mixed with wines inftead of fugar; for which purpofe it is very much ufed in Holland, and fome other countries; as alfo for giving a new fret, or brifknefs to decayed wines: fo that very large quantities of this ftum are annually imported to all parts, along with the foreign wines. And after the fame manner a ftum is prepared in England, from the juice of apples, which ferves the ordinary purpofes of the wine-cooper. In the preferving this liquor in this ftate, we fee the vaft ufe of brimftone, for it could never be done otherwife than by the matching of the cafks.

Dr. Shaw gives the following method of preparing an artificial ftum, nothing inferior to the natural; and as fit for the refermenting, fretting, improving, or making of wines, vinegars, and fpirits. Take three pound of fine lump fugar, or fuch as has been well refined from its treacle; melt it in three quarts of water, and add, in the boiling, of rhenifh tartar, finely powdered, half an ounce; this diffolves with a remarkable ebullition, and gives a grateful acidity to the liquor: take the veffel from the fire, and fuffer it to cool, and you have an artificial muft, which in all refpects refembles the natural tafte and fweet juice of a white flavourlefs grape, when well purified, and racked off from its fediment, in order to make ftum. If this artificial muft be ftummed, that is, well fumigated with burning brimftone, it becomes a perfect ftum, and may be made of any flavour, at the difcretion of the artift.

STUNG, or Adder stung. See the article Adder.

STUPEFIERS, in medicine, the fame with narcotics and opiates. See the articles Narcotics and Opiates.

STUPOR, a numbneſs in any part of the body, whether occaſioned by ligatures obſtructing the blood's motion, by the palſy, or the like.

STUPHA, or STUPE, in medicine, is a piece of cloth dipped in ſome proper liquor, and applied to an affected part, by way of fomentation or epithem. See the articles FOMENTATION and EPITHEM.

STURGEON, *ſturio*, in ichthyology, a ſpecies of accipenſer, with the body armed with rough tubercles. See the article ACCIPENSER.

The ſturgeon is a very large fiſh, growing to fourteen, ſixteen, or eighteen feet in length; though the greater part are caught much ſmaller. There are four cirri at the extremity of the under jaw; the eyes are large, and ſtand at a great diſtance from the extremity of the roſtrum or ſnout: but what is very ſingular in the ſturgeon, is the ſpinoſe tubercles, of which there are ſeveral ſeries or rows. See plate CCLXII. fig. 4.

STURMINSTER, a market-town, eighteen miles north of Dorcheſter.

STURNUS, the STARLING, in ornithology. See the article STARLING.

STUTGART, a city of Swabia, ſituated on the river Neckar, in eaſt long. 9°, and north lat. 48° 40′.

STYE, or STITHE, a diſorder of the eyelids; being a ſmall encyſted tumour, about the bigneſs of a barley-corn.

The ſtye frequently occaſions much pain and uneaſineſs, and muſt be treated with great caution, on account of the tenderneſs of the eye. Some recommend cataplaſms, and the like applications, to theſe; but the eye is often hurt by thoſe applications, and it is obſerved beſides, that theſe turbercles ſeldom give way to topical applications of any kind.

When they are ſmall, Heiſter thinks it beſt to let them take their own courſe; but if ſo large as to occaſion deformity or danger of hurting the ſight, the way to extirpate them, is to make a longitudinal inciſion on the part, and carefully take them out whole; or, if it cannot be thus got out clean, it muſt be cut out, as far as may be done, with ſciſſars, and dreſſed with egyptian ointment, and a little red precipitate, or touched at times with the common cauſtic, till eaten thoroughly away, and then the wound dreſſed and healed in the common manner.

This is the method by which the flat and broad bottomed tumours of this kind are to be extirpated; and in this, great care muſt be taken that none of the ſharp applications touch the eye, as they might injure the ſight. It is common, however, with theſe tumours to hang by a ſort of ſmall root, and then they are much more eaſily managed, there being no more neceſſary than the cutting them cloſe off, with a pair of ſciſſars, or the tying them firmly round with a piece of ſilk or horſe-hair. They are ſometimes, if taken in time, diſperſed by rubbing them with faſting ſpittle, or by applying the pulp of a roaſted apple mixed with ſome ſaffron and camphor.

STYGIAN LIQUORS, an appellation given to cauſtic and corroſive waters, and particularly to aqua regia. See AQUA.

STYLE, a word of various ſignifications, originally deduced from στυλος, a kind of bodkin, wherewith the antients wrote on plates of lead, or on wax, *&c.* and which is ſtill uſed to write on ivory-leaves, and paper prepared for that purpoſe, *&c.*

*Lapidary's* STYLE. See LAPIDARY.

STYLE, in dialling, denotes the gnomon or cock of a dial, raiſed on the plane thereof, to project a ſhadow. See the articles DIAL and GNOMON.

STYLE, in botany, is a part of the piſtil of plants, and is of various figures, but always placed on the germen: it gives origin to the ſtigma. In ſome plants it is extremely ſhort, and in others it ſeems entirely wanting. See the articles PISTIL, STIGMA, and GERMEN.

STYLE, in matters of language, a particular manner of expreſſing one's thoughts agreeably to the rules of ſyntax; or, as F. Buffier more accurately defines it, the manner wherein the words, conſtructed according to the laws of ſyntax, are arranged among themſelves, ſuitably to the genus of the language.

From this deſcription it appears, that the ſtyle ſuppoſes, or includes the ſyntax; and that ſyntax does not extend ſo far as ſtyle, for the ſyntax may be juſt, where the ſtyle is wretched. A fault in ſtyle is not leſs a fault againſt grammar, than is a fault in ſyntax; only the former is leſs preciſe and palpable than the latter. A very common error in grammarians, F. Buffier adds, is to confound two kinds of ſtyles in one: grammatical ſtyle, or that directed by the rules of grammar; and the perſonal ſtyle, which depends leſs on the grammar than on the perſon that writes, whether with regard to his particular taſte and genius, or with regard to his

his matter, or the kind or character of his work. There are a great many differences between the two; the most essential is, that the one may be diversified an infinite number of ways, and the other cannot. In effect, the personal style is naturally variable, according to the different genius, humours, and complexions.

It is the imagination that acts, that conceives, that proposes, and that expresses things, according to its character, which is different in all men, and which is to be varied according to the particular kind of the work. Hence arise the gay, the grave, the florid, the jejune, the copious, the concise, the poetical, the epistolary, and the burlesque styles. These personal styles are all independent on the grammatical; and we have authors who excel in the one, and are miserably defective in the other. The personal style is not under the direction of grammar, but of the imagination, or rather of rhetoric, that art having to do directly with our thoughts, as grammar with our words. This, however, may be said, that grammar is far from being able to vary the same words of a phrase, with equal perfection; and that there is but one way of delivering them in the taste and genius of the language.

In oratory and poetry, style is restrained wholly to what F. Buffier calls the personal style. Language refers principally to the matter of the discourse, *viz.* the words; elocution to the particular members or parts thereof; and style to the whole composition. The masters of the art reduce the kinds of style to three; the sublime, the low, and the intermediate or equable style. The sublime style is that consisting in magnificent words and sentences; which, by its noble boldness, ravishes the hearers, and extorts admiration, even from the unwilling. See the article SUBLIME.

Low or simple style is that ordinarily used in smaller and humbler works, as epistles, dialogues, and common discourse. The chief virtues hereof are perspicuity, smoothness, easiness, and cleanliness. It must be very sparing in the use of tropes and figures, especially the more violent ones, as the prosopopœia, apostrophe, &c. See the article PROSOPOPOEIA, &c.

Intermediate or equable style partakes of the magnificence of the sublime, and the simplicity of the low. It neither rises to the majesty of the one in words and sentences, nor yet is smartly pointed like the other. Tully calls this the polished and florid style; it being in this that all the graces and beauties of language are principally to be used.

As to the choice of style in the general, the nature of the subject is to determine it. Such style, says Cicero, is to be chosen as expresses great things magnificently, middle things moderately, and low things subtilly: but more particularly as there are three branches of the duty of an orator, to teach, to delight, and to move; the simple style is used to teach, the middle to delight, and the sublime to move. Again, the simple or low style is fit for comedy, the sublime for tragedy, and the middle for history. Again the simple style is fit for bucolics and eclogues, the intermediate for georgics, and the sublime for epics: which triple difference we may discern in Virgil, though he sometimes mixes them all in the Æneid itself, using the simple style in the fifth book, where he describes games; and the intermediate in the beginning of the poem. Care is still to be taken that the style be not flat and dull, on pretence of being simple.

The chief faults in style are its being tumid and swoln, or cold and puerile, or stiff, or loose, or dry and jejune. A tumid style is that immoderately stuffed with big words and sentences. Frigid or puerile style is that which affects certain trifling ornaments, insipid jests, remote and strained allusions, redundant descriptions, &c. Loose style is that which, wanting articles, numbers, &c. fluctuates here and there, not connected or joined together. Dry jejune styles, is that which is destitute of ornament, spirit, &c.

The antients made a notable distinction of styles into Laconic and Asiatic: laconic style is distinguished by its exceeding conciseness, and by comprehending a deal of matter under a few words: asiatic style, on the contrary, is that which is very diffusive and prolix, or where abundance of words are used to express a little matter.

STYLE, in jurisprudence, the particular form, or manner of proceeding in each court of jurisdiction, agreeable to the rules and orders established therein: thus we say the style of the court of Rome, of Chancery, of Parliament, of the Privy-council, &c.

STYLE, in music, denotes a peculiar manner of singing, playing, or composing;

being properly the manner that each perſon has of playing, ſinging, or teaching; which is very different both in reſpect of different geniuſes, of countries, nations, and of the different matters, places, times, ſubjects, paſſions, expreſſions, *&c.* Thus we ſay the ſtyle of Paleſtrina, of Lully, of Corelli, of Handel, *&c.* the ſtyle of the Italians, French, Spaniards, *&c.* The ſtyle of gay pieces of muſic is very different from that of ſerious ones; and the ſtyle of church muſic is very different from theatrical muſic. The ſtyle of the italian compoſitions is poignant, florid, expreſſive: that of the french compoſitions, natural, flowing, tender, *&c.* Hence the various epithets given to diſtinguiſh the various characters; as the antient and modern ſtyles; the italian and german ſtyles; the eccleſiaſtical and dramatic ſtyles; the gay, the grave, majeſtic, natural, ſoft, familiar, gallant, low, ſublime ſtyles, *&c.*

The ſtylo recitativo, or dramatico, in the italian muſic, is a ſtyle fit to expreſs the paſſions: the ſtylo eccleſiaſtico, is full of majeſty, very grave, and fit to inſpire devotion: ſtylo motectico, is a various rich, florid ſtyle, capable of all kinds of ornaments, and of conſequence fit to expreſs various paſſions, particularly admiration, grief, *&c.* ſtylo madrigaleſco is a ſtyle proper for love, and the other ſofter paſſions: ſtylo hyperchematico is a ſtyle proper to excite joy, mirth, and dancing, and conſequently full of briſk and gay motions: ſtylo ſymphoniaco, is a ſtyle fit for inſtrumental muſic: but as each inſtrument has its peculiar effects, there are as many different ſymphonical ſtyles: the ſtyle of the violin, for inſtance, is uſually gay; that of the flutes, melancholy and languiſhing; that of trumpets, ſprightly and animating: ſtylo meliſmatico is a natural artleſs ſtyle, which any body almoſt may ſing, fit for airs and ballads: ſtylo fantaſtico, is an eaſy humorous manner of compoſition, free from all conſtraints, *&c.* ſtylo choraico, a ſtyle that is proper for dancing, and is divided into as many different kinds as there are different dances; as the ſtyle of ſarabands, minuets, gavots, jiggs, rigadoons, chacones, *&c.*

*Old* STYLE, the julian manner of computing times, as the

*New*-STYLE is the gregorian method of computation. See the articles JULIAN, GREGORIAN, BISSEXTILE, *&c.*

STYLET, or STILETTO, a ſmall dangerous kind of poinard, which may be concealed in the hand, chiefly uſed in treacherous aſſaſſinations. The blade is uſually triangular, and ſo ſlender that the wound it makes is almoſt imperceptible. The ſtylet is prohibited in all well-diſciplined ſtates.

STYLITES, an appellation given to a kind of ſolitaries, who ſpend their lives ſeated on the tops of columns, to be, as they imagine, the better diſpoſed for meditation, *&c.* Of theſe we find ſeveral mentioned in antient writers, and even as low as the eleventh century. The founder of the order was St. Simon Stylites, a famous anchoret in the fifth century, who took up his abode on a column ſix cubits high; then on a ſecond, of twelve cubits; a third, of twenty-two; and, at laſt, on another of thirty-ſix. The extremity of theſe columns were only three feet in diameter, with a kind of rail or ledge about it that reached almoſt to the girdle, ſomewhat reſembling a pulpit. There was no lying down in it. The faquirs, or devout people of the eaſt, imitate this extraordinary kind of life even to this day.

STYLOGLOSSUS, in anatomy, a muſcle ariſing from the apex of the ſtyloide proceſs; and, deſcending obliquely to the ſide and root of the tongue, moves it ſideways, backwards and forwards.

STYLOHYOIDÆUS, in anatomy, a pair of muſcles ariſing in the ſtyloide proceſs, and terminating in the horn and the baſe: this is often perforated by the digaſtric muſcle of the jaw. Theſe muſcles draw laterally upwards.

STYLOIDES, in anatomy, an apophyſis of the os petroſum, thus called from its reſembling a ſtyle or ſtylet.

STYLOPHARYNGÆUS, in anatomy, one of the ſix pair of muſcles which ſerve to dilate the pharynx. See the article PHARYNX.

The ſtylopharingæus ariſes from the beginning of the ſtyloide proceſs, and is inſerted on both ſides into this and into the thyroide proceſs: it ſerves alſo to elevate as well as dilate the pharynx.

STYPTIC, στυπτικὸν, in pharmacy, medicines which by their aſtringent qualities ſtop hæmorrhages. See the article HÆMORRHAGE.

When a conſiderable hæmorrhage is ſtopt by abſorbents or ſtyptics, it is always produced by means of a clot of blood, ſecured by compreſſion, ſo that the orifice

fice of the veffel is ftopt. This clot generally confifts of two parts, the one without, and the other within, the veffel: that without is formed by the laft flowing blood, which, in coagulating, incorporates itfelf with the lint, mofs, or powders, ufed for ftopping the blood: the other part of the clot within the veffel, is only that portion of the blood which was ready to be difcharged when the veffel was ftopped. Thefe two parts are often but one continued clot. That without the veffel performs the office of a covering, whilft that within ferves as a kind of ftopper. Alcohol, or pure fpirit of wine, is the moft ufual, and perhaps the beft, ftyptic; and is the bafis of moft of the celebrated arcana for ftopping hæmorrhages. Boerhaave fays it becomes an immediate ftyptic, as it prevents putrefaction, and occafions a thin but very folid efchar. For if pledgits be dipped in pure alcohol, made hot, and applied to a bleeding wound, if it be clofely compreffed upon the part, and covered with a piece of bladder lightly befmeared with oil, and kept on with a proper bandage, the hæmorrhage prefently ceafes, and the whole dreffing may continue unremoved for three days, in which time the veffels are ufually clofed and ftrongly contracted and confolidated, by means of the alcohol.

The ftyptic powder of Helvetius is a medicine faid to be ferviceable in uterine hæmorrhages, either to correct the too frequent return of the menfes, or their too great abundance; alfo to ftop the flooding to which women with child are fubject, and to moderate the flow of the lochia. It is alfo found to have very furprizing good effects in the fluor albus. It is a compofition of alum and dragon's-blood: and in the Edinburgh Difpenfatory, two parts of alum are directed to be made into powder with one of the dragon's-blood: others ufe equal parts of both. Heifter recommends this powder or alum alone, with a decoction of linfeed.

Eaton's ftyptic is famous for curing frefh wounds in a very fmall time, and immediately ftopping their bleeding: but Dr. Sprengel is faid to prove, beyond all poffibility of doubt, that this is in effect no other than the ftyptic of Helvetius.

The female agaric has been of late greatly celebrated as a ftyptic, and is faid to reftrain not only the venal but arterial hæmorrhages, without the ufe of ligatures. See the article AGARIC.

STYRAX, STORAX, in botany, a genus of the icofandria-monogynia clafs of plants, the corolla whereof is monopetalous and funnel-fhaped: the tube is cylindric, and no longer than the cup: the fruit is a roundifh drupe, having only one cell: the feeds are two roundifh acuminated nuts, convex on one fide and plane on the other. This tree is a native of feveral parts of Europe and of the eaft: in the latter part of the world it affords the fragrant refin called ftyrax, on wounding its trunk: for the virtues, *&c.* whereof fee the article STORAX.

SUANA, or SOVANA, a town of Italy, in the dutchy of Tufcany, and province of Sienna: fituated on the confines of the dutchy of Caftro, fifty miles fouth of Sienna.

SUB, a latin prepofition, fignifying *under*, or *below*, frequently ufed in compofition in our language; thus, 1. Sub-brigadier is an officer in the cavalry who commands under the brigadier, affifting him in the difcharge of his office. 2. Sub-chantor, an officer in the choir, who officiates in the abfence of the chantor. 3. Sub-deacon, an antient officer in the church that was made by the delivery of an empty platter and cup by the bifhop; and of a pitcher, bafon, and towel by the arch-deacon. His office was to wait on the deacon with the linen whereon the body, *&c.* was confecrated, and to receive and carry away the plate with the offerings at the facraments, and the cup with the wine in it, *&c.* 4. Sub-dean, a dignity in fome chapters beneath the dean. 5. Sub-marfhal, an officer in the Marfhalfea that is deputy to the chief-marfhal of the king's houfe, who is commonly called knight-marfhal, and has the cuftody of the prifoners there. 6. Sub-prior, a clauftral officer who affifts the prior, *&c.* See BRIGADIER, CHANTOR, DEACON, DEAN, *&c.*

SUBALTERN, a fubordinate officer, or one who difcharges his poft under the command, and fubject to the direction of another: fuch are lieutenants, fub-lieutenants, coronets and enfigns, who ferve under the captain; but cuftom has now appropriated the term to thofe of much lower ranks, as ferjeants, and the like. We alfo fay fubaltern-courts, jurifdictions, *&c.* fuch are thofe of inferior lords, with regard to the lord paramount;

mount; hundred courts, with regard to county-courts, *&c.*

SUBBUTEO, in ornithology, the yellow-legged falco, with the head brown, and the ſhoulders and belly white. See the article FALCO.

SUBCLAVIAN, *ſubclavius*, in anatomy, is applied to any thing under the arm-pit or ſhoulder, whether artery, nerve, vein, or muſcle.

Subclavius more particularly denotes a ſmall oblong muſcle lying between the clavicle and firſt rib. It is fixed by one end in all the middle lower portion of the clavicle, at the diſtance of about an inch from each extremity, and by the other in the cartilage, and a ſmall part of the bone of the firſt rib.

SUBCONTRARY POSITION, in geometry, is when two ſimilar triangles are ſo placed as to have one common angle V, (plate CCLXII. fig. 7) at the vertex, and yet their baſes not parallel. If the ſcalenous cone, B V D, be ſo cut by the plane C A, as that the angle at C = the angle at D, the cone is then ſaid to be cut ſubcontrarily to its baſe BD.

SUBCOSTAL MUSCLES, *ſubcoſtales*, in anatomy. Theſe muſcles are fleſhy planes of different breadths, and very thin, ſituated more or leſs obliquely on the inſide of the ribs, near their bony angles, and running in the ſame direction with the external intercoſtals. They are fixed by other extremities in the ribs, the inferior extremity being always at a greater diſtance from the vertebræ than the ſuperior, and ſeveral ribs lying between the two inſertions. Theſe muſcles are more ſenſible in the lower ribs than in the upper, and they adhere cloſely to the ribs that lie between their inſertions.

SUBCUTANEUS, in anatomy, a thin membranous muſcle, running under the ſkin, called alſo quadratus genæ, and platiſma myoides. It ariſes with a pretty broad origin from the hind part of the neck, and from the pectoral muſcle below the clavicle. It adheres firmly to the paniculus carnoſus, from which it is not ſeparated without difficulty, and therefore it was not antiently diſtinguiſhed from it. It is inſerted obliquely on each ſide into the lower jaw-bone, near the ſkin, lips, and ſometimes the bottom of the noſe, all which parts it draws downwards and awry. A convulſion herein is called the cynic ſpaſm. In ſome perſons it reaches to the ears, which is the reaſon that ſome have the faculty of moving their ears which others want.

SUBCUTANEOUS GLANDS, in anatomy. See the article GLAND.

SUBDUCTION, in arithmetic, the ſame as ſubſtraction. See SUBSTRACTION.

SUBDUPLE RATIO, is when any number or quantity is contained in another twice: thus 3 is ſaid to be ſubduple of 6, as 6 is duple of 3.

SUBDUPLICATE RATIO of any two quantities is the ratio of their ſquare roots. See the article RATIO.

SUBER, the CORK TREE, in botany, a ſpecies of quercus. See the article OAK.

SUBJECT, *ſubditus*, a perſon under the rule and dominion of a ſovereign prince or ſtate.

SUBJECT, *ſubjectum*, is alſo uſed for the matter of an art or ſcience, or that which it conſiders, or whereon it is employed: thus the human body is the ſubject of medicine. In this ſenſe the anatomiſts call the body they are diſſecting, and whereon they read lectures, their ſubject. The ſubject of logic is thinking or reaſoning; but more particularly in a ſyllogiſm one of the terms of a propoſition is called the ſubject, and the other the attribute. In poetry, the ſubject is the matter treated of, or the event related or ſet to view. Subject alſo denotes the ſubſtance or matter to which an accident is added, whence the maxim that two contraries can never ſubſiſt in the ſame ſubject.

SUBJECT, in the manege. To keep the horſe ſubject, is an expreſſion relating to colts, ſignifying to keep the croupe of the horſe in the round ſo that it may not ſlip out; that he may not tranſverſe; and that he may work, in the manege, croupe in, marking his equal times, without loſing his ground.

SUBJECT, in muſic. See SOGETTO.

SUBJUNCTIVE, in grammar, the ſecond mood of verbs, thus called becauſe ſubjoined to another verb, or particle at leaſt, and not ſtanding alone in a ſentence: thus *Orat ut ad ſe venias. Quid faciam prorſus ignoro. Though this were true, &c.* See the article MOOD.

SUBLIMABLE BODIES, a term uſed by ſome of our chemical writers to expreſs ſuch ſubſtances as are capable of ſublimation in a dry form. See the article SUBLIMATION.

SUBLIMATE, a chemical preparation, the baſis whereof is mercury or quickſilver.

silver. There are two kinds of sublimate, corrosive sublimate and sweet sublimate, or mercurius dulcis sublimatus, which see under MERCURY.

SUBLIMATION, the condensing and collecting in a solid form by means of vessels aptly constructed, the fumes of bodies raised from them, by the application of a proper heat. Sublimation is in all respects the same with distillation, except that in the first the produce is solid, but in the latter fluid. The only variation therefore necessary in the operation, is the accommodating the recipient part of the apparatus to this difference, which admits, in most cases, that one vessel may perform the office both of condenser and receiver, as the matter cannot, like fluids, flow to another part, but must remain where it first settles, except in some instances where the matter is extremely volatile, or where a fluid rising with it renders a depending receiver necessary. See DISTILLATION.

The vessels proper, in respect of the different subjects of this operation, vary in their structure and the substance of which they are made, as well on account of the degree of heat requisite to be employed, as the nature of the matter to be sublimed, since corrosions of them are here, and indeed in all other cases, to be carefully avoided. In sublimations of mercury, whether combined with acids or sulphur, of sal ammoniacum and of sulphur alone, a single vessel may answer all the purposes, as their necessity of a great heat to keep them in the condition of fumes renders the upper part of the glass capable of detaining them when they are raised thereto; but it is proper, in these instances, that a glass in sand, or earthen ware should be used. A glass body, in a strong sand heat, may very well serve for all these; but sublimate of mercury is frequently sublimed in a bolt-head, or matrass; and the factitious cinnabar, by those who make large quantities, in an earthen vessel made in the shape of an egg. In the sublimation of volatile salt of amber, and flowers of benjamin, a container and condenser are separately necessary, and may in all these cases be extremely well supplied by a retort and receiver, though bodies with alembic heads, and receivers of glass fitted to them, have been generally recommended in several of them; but the trouble of luting two junctures, and the difficulty of fitting them to each other, with several other reasons, make retorts far more convenient. A retort and receiver are likewise proper in the case of cinnabar of antimony; for though the cinnabar might be restrained in one glass, the butter of antimony makes the receiver necessary.

In sublimations of factitious cinnabar, mercury sublimate, and sal-ammoniacum, it is sufficient to cover the aperture or neck of the vessel with a tile; and in the sublimation of cinnabar of antimony, and flowers of benjamin, in retorts, it is unnecessary to lute on the receiver; but in the sublimation of volatile salts, it is requisite to lute the vessels as secure as possible, leaving only a small vent till they attain the greatest heat they are to suffer during the operation.

The requisite degree of heat in sublimation varies in almost every different subject of the operation. The limits are from the greatest degree that can be given in sand, to a degree something less than that which will make water boil. See the article HEAT.

Hoffman observes, that only those things are sublimable which contain a dry exhaleable matter in their original construction, and among these is found a great variety, which require various methods and means to execute that effect. Among the minerals, sulphur, antimony, and orpiment, are named as the principal sublimable bodies: these are of a very lax compage or structure, and easily raised by fire in small particles, which concrete again on being stopt from flying off by the cover of the vessel; while, on the contrary, iron, silver, and the other metals being of a closer structure, remain fixed in the greatest heat, and never ascend without being mixed with some volatile substance that is of itself capable of rising and taking up some of them with it. Thus copper and iron will be raised in sublimation by means of sal ammoniac mixed with them; and even gold itself is said to be subject to the same law; Mr. Boyle assuring us that he had a secret method of preparing a certain saline substance, by means of a very small admixture of which, gold would be made to rise in sublimation, and form fine purple crystals. The admixtures which make bodies sublimable that are not so in themselves, are to be of various kinds, according to the nature of the body to be sublimed. Among these, some act by rendering the body more easily fusible,

fusible, and disuniting those particles more readily which the fire is expected to carry up: others act again by preventing the cohesions of the particles of the substance to be sublimed, which heat would otherwise occasion: and, finally, others, by entering the body of the fixed substance they are mixed with, and giving wings, as it were, to its subtle particles, so that they may ascend with its easily sublimable matter, and join with it in the formation of one mixed substance in the top of the vessel, by partaking of the nature of both. Others act potentially in the same way, but by different means, themselves not being capable of sublimation, but acting on the substance to be sublimed, by enervating, weakening, or absorbing those substances, or parts, of the mixed body, which would otherwise have prevented the ascent of the rest: and, finally, some act as dissolvents only, and by that means render things easy of sublimation, which would have been very difficultly so, while their parts were in a more strict continuity.

SUBLIME, in discourse, is defined by Boileau, to be something extraordinary and surprising, which strikes the soul, and makes a sentiment or composition ravish and transport.

From this definition it appears, that the sublime is a very different thing from what the orators call the sublime style. The sublime style necessarily requires big and magnificent words; but the sublime may be found in a single thought, a single figure, a single turn of words. A thing may be in the sublime style and yet not be sublime; that is, it may have nothing extraordinary and surprizing. See the article STYLE.

Longinus makes five sources of the sublime: the first a certain elevation of the mind, which makes us think happily: the second is the pathetic, or that natural vehemence and enthusiasm which strikes and moves us; these two are wholly owing to nature, and must be born with us; whereas the rest depend partly on art: the third is the turning of figures in a certain manner, both those of thoughts and of speech: the fourth, nobleness of expression; which consists of two parts, the choice of words, and the elegant figurative diction: the fifth, which includes all the rest, is the composition and arrangement of the words in all their magnificence and dignity.

SUBLINGUAL GLANDS, in anatomy, two glands under the tongue, placed one on each side thereof. These, called also hypoglottides, filtrate a serous humour of the nature of saliva, which they discharge by little ducts near the gums into the mouth. See GLAND.

SUBMULTIPLE, in geometry, *&c.* A submultiple number, or quantity, is that which is contained a certain number of times in another, and which therefore, repeated a certain number of times, becomes exactly equal thereto: thus 3 is a submultiple of 21; in which sense submultiple coincides with an aliquot part. See the article ALIQUOT *part.*

SUBMULTIPLE RATIO, is that between the quantity contained and the quantity containing: thus the ratio of 3 to 21 is submultiple. In both cases submultiple is the reverse of multiple, 21, *e. g.* being a multiple of 3, and the ratio of 21 to 3 a multiple ratio. See RATIO.

SUBNORMAL, in geometry, a line which determines the point in the axis of a curve, where a normal, or perpendicular, raised from the point of contact of a tangent to the curve, cuts the axis. Or the subnormal is a line which determines the point wherein the axis is cut by a line falling perpendicularly on the tangent in the point of the contact: Thus T M (plate CCLXII. fig. 6.) being a tangent to a curve in M, and M R a normal or perpendicular to the tangent, the line P R intercepted between the semiordinate P M, and the normal M R, is called the subnormal. Hence 1 in a parabola as AM, *&c.* the subnormal PR is to the semi-ordinate P M, as P M is to PT, and M R to TM. 2. In the parabola the subnormal P R is subduple the parameter, and, consequently, an invariable quantity.

SUBORDINATION, a relative term, expressing the degree of inferiority between one thing and another.

SUBORNATION, a secret or under-hand preparing, instructing, or bringing in a false witness; or corrupting or alluring a person to do such a false act. Hence, subornation or perjury is a corrupting or inticing a person to perjury. See the article PERJURY.

Persons suborning a witness to give false evidence, are liable to 40 l. forfeiture, or to be imprisoned for half a year, stand on the pillory, *&c.*

SUBPOENA, in law, a writ whereby all common persons, or those under the degree of peerage, may be called into chan-

cery, in any cafe where the law cannot afford a remedy. The peers, in like cafes, are called by the lord chancellor's letters, giving notice of the fuit intended againft them, and requiring them to appear. There are divers forts of thefe writs in the court of chancery, as the fubpœna ad refpondendum, to anfwer; fubpœna ad replicandum, to reply; fubpœna ad teftificandum, to give evidence; and the fubpœna ad audiendum judicium, *&c.* It is here to be obferved that a fubpœna ad teftificandum, lies for the bringing in of witneffes, to give their evidence in a caufe, not only in the court of chancery, but in all other courts. The fubpœna to anfwer, is the leading procefs in courts of equity; and by ftatute, when a bill is filed againft a perfon, this fubpœna may be taken out, which muft be ferved perfonally on the defendant, or left at his houfe, with one of his family; on affidavit made whereof, if any fuch defendant does not appear and anfwer the bill, an attachment fhall iffue againft him. A writ of fubpœna takes its name from the words thereof, which charge the party fummoned to appear at the day and place affigned, *fub pœna centum librorum*, on the penalty of 100 l. which is inferted in terrorem, it being never levied.

SUBREPTION, *fubreptio*, the act of obtaining a favour from a fuperior, by furprife or a falfe reprefentation. See the next article.

SUBREPTITIOUS, or SURREPTITIOUS, a term applied to a letter, licence, patent, or other act, fraudulently obtained of a fuperior, by concealing fome truth, which had it been known, would have prevented the conceffion or grant; in which cafe, the benefits of letters, licences, *&c.* are forfeited.

SUBROGATION, or SURROGATION, in the civil law, the act of fubftituting a perfon in the place, and entitling him to the rights, of another: but, in its general fenfe, fubrogation implies a fucceffion of any kind, whether of a perfon to a perfon, or of a perfon to a thing. There are two kinds of fubrogation, the one conventional, the other legal. Conventional fubrogation is a contract, whereby a creditor transfers his debt, with all appurtenances thereof, to the profit of a third perfon. Legal fubrogation is that which the law makes, in favour of a perfon who difcharges an antecedent creditor, in which cafe there is a legal tranflation of all rights of the antient creditor to the perfon of the new one. This the civilians more ufually call fucceffion, as being wholly the work of the law; and to diftinguifh it from the conventional fubrogation, which they alfo call ceffion.

SUBSCAPULARIS, in anatomy, a mufcle arifing from the bafis and fide of the fcapula, and, fpreading itfelf under the whole convex or under-fide of it, is inferted by a femi-circular tendon, into the neck of the os humeri, and draws it down to the fide of the trunk. See SCAPULA.

SUBSCRIPTION, in general, fignifies the fignature put at the bottom of a letter, writing, or inftrument.

In commerce, it is ufed for the fhare or intereft, which particular perfons take in a public ftock, or a trading company, by writing their names, and the fhares they require, in the books or regifter thereof.

Subfcription, in the commerce of books, fignifies an engagement to take a certain number of copies of a book intended to be printed, and a reciprocal obligation of the bookfeller, or publifher, to deliver the faid copies, on certain terms. The ufual conditions of thefe fubfcriptions are, on the part of the bookfeller, to afford the books cheaper to a fubfcriber than to another, by one third or one fourth, of the price; and on the part of the latter, to advance half the money in hand, and to pay the reft on the delivery of the copies. Thefe fubfcriptions, which had their rife in England, about the middle of the laft century, are now become frequent in France and Holland, but exceedingly more fo among ourfelves of late: and it is not without foundation complained, that their frequency has rendered them liable to fome abufes, which feem very much to difcredit them.

SUBSEQUENT, fomething that comes after another, particularly with regard to the order of time.

SUBSIDY, in law, fignifies an aid or tax granted to the king, by parliament, for the neceffary occafions of the kingdom; and is to be levied on every fubject of ability, according to the rate or value of his lands or goods: but this word, in fome of our ftatutes, is confounded with that of cuftoms.

SUBSISTENCE, in the military art, is the money paid to the foldiers weekly, not amounting to their full pay; becaufe their cloaths, accoutrements, tents, bread, *&c.* are to be paid. It is likewife the money paid to officers upon account, till their accounts be made up, which is ge-

nerally

nerally one a year, and then they are paid their arrears.

SUBSTANCE, *ſubſtantia*, ſomething that we conceive to ſubſiſt of itſelf, independently of any created being, or any particular mode or accident. See MODE.

Our ideas of ſubſtances, Mr. Locke obſerves, are only ſuch combinations of ſimple ideas, as are taken to repreſent diſtinct things ſubſiſting by themſelves, in which the confuſed idea of ſubſtance is always the chief. Thus the combination of the ideas of a certain figure, with the powers of motion, thought, and reaſoning joined to the ſubſtance, make the ordinary idea of a man: and thus the mind obſerving ſeveral ſimple ideas to go conſtantly together, which being preſumed to belong to one thing, or to be united in one ſubject, are called by one name, which we are apt afterwards to talk of, and conſider, as one ſimple idea. See the article IDEA.

We imagine theſe ſimple ideas do not ſubſiſt by themſelves, but ſuppoſe ſome ſubſtratum wherein they ſubſiſt, which we call ſubſtance. The idea of pure ſubſtances is nothing but the ſuppoſed, yet unknown ſupport of theſe qualities, which are capable of producing ſimple ideas in us. The ideas of particular ſubſtances are compoſed out of this obſcure and general idea of ſubſtance, together with ſuch combinations of ſimple ideas, as are obſerved to exiſt together, and ſuppoſed to flow from the internal conſtitution and unknown eſſence of that ſubſtance. Thus we come by the ideas of man, horſe, gold, &c. Thus the ſenſible qualities of iron, or a diamond, make the complex ideas of thoſe ſubſtances, which a ſmith, or a jeweller, commonly knows better than a philoſopher. The ſame happens concerning the operations of the mind, *viz.* thinking, reaſoning, &c. which we concluding not to ſubſiſt by themſelves, nor comprehending how they can belong to body, or be produced by it, we think them the actions of ſome other ſubſtance, which we call ſpirit, of whoſe ſubſtance or nature we have as clear a notion as of that of body, the one being but the ſuppoſed ſubſtratum of the ſimple ideas we have from without, as the other of thoſe operations which we experiment in ourſelves within; ſo that the idea of corporeal ſubſtance in matter, is as remote from our conceptions, as that of ſpiritual ſubſtance. See the articles ESSENCE and EXISTENCE.

Hence we may conclude, that he has the moſt perfect idea of any particular ſubſtance, who has collected moſt of thoſe ſimple ideas which do exiſt in it, among which we are to reckon its active powers and paſſive capacities, though not ſtrictly ſimple ideas.

Subſtances are generally diſtinguiſhed by ſecondary qualities, for our ſenſes fail us in the diſcovery of primary ones, as the bulk, figure, texture, &c. of the minute parts of bodies, on which their real conſtitutions and differences depend; and ſecondary qualities are nothing but powers with relation to our ſenſes. The ideas that make our complex ones of corporeal ſubſtances, are of three ſorts: firſt, the ideas of primary qualities of things, which are diſcovered by our ſenſes; ſuch are bulk, figure, motion, &c. Secondly, the ſenſible ſecondary qualities, which are nothing but powers to produce ſeveral ideas in us, by our ſenſes. Thirdly, the aptneſs we conſider in ſubſtance, to cauſe or receive ſuch alterations of primary qualities, as that the ſubſtance ſo altered, ſhould produce in us different ideas from what it did before; and they are called active and paſſive powers: all which, as far as we have any notice or notion of them, terminate in ſimple ideas. See the article QUALITY.

Beſides the complex ideas we have of material ſubſtances, by the ſimple ideas taken from the operations of our own minds, which we experiment in ourſelves, as thinking, underſtanding, willing, knowing, &c. co-exiſting in the ſame ſubſtance, we are able to frame the complex idea of a ſpirit; and this idea of an immaterial ſubſtance is as clear as that we have of a material one. By joining theſe with ſubſtance, of which we have no diſtinct idea, we have the idea of ſpirit; and by putting together the ideas of coherent, ſolid parts, and a power of being moved, joined with ſubſtance, of which likewiſe we have no poſitive idea, we have the idea of matter. See the article MATTER and SPIRIT.

Further, there are other ideas of ſubſtances, which may be called collective; which are made up of many particular ſubſtances conſidered as united into one idea, as a troop, army, &c. which the mind makes by its power of compoſition. Theſe collective ideas are but the artificial draughts of the mind, bringing things, remote and independent, into one view, the better to contemplate and diſcourſe of them

united

united into one conception, and fignified by one name: for there are no things fo remote, which the mind cannot, by this art of compofition, bring into one idea; as is vifible in that fignified by the name univerfe. See COMPOSITION.

SUBSTANTIAL, in the fchools, fomething belonging to the nature of fubftance.

It is generally difputed, whether or no there be fuch things as fubftantial forms? *i. e.* forms independent of all matter; or forms that are fubftances themfelves.

Subftantial is alfo ufed in the fame fenfe with effential, in oppofition to accidental.

SUBSTANTIVE, in grammar, a noun, or name, confidered fimply and in itfelf, without any regard to its qualities, or other accidents, in contradiftinction to the noun termed adjective, or that which expreffes a certain quality or accident of the noun fubftantive. Or, a noun fubftantive is that noun, which joined to a verb, makes a perfect fentence, as *a man, a horfe, a tree*; thus, *a man laughs, a horfe gallops, a tree buds*, are each of them perfect fentences. All nouns, to which one cannot add the word *thing*, are fubftantives; and thofe to which *thing* may be added, are adjectives. See the articles NOUN, ADJECTIVE, and VERB. Subftantives are divided into proper and appellative. See the articles PROPER and APPELLATIVE.

SUBSTANTIVE VERB. See VERB.

SUBSTITUTE, a perfon appointed to officiate for another, in cafe of abfence or other legal impediment.

SUBSTITUTE, in medicine, denotes a drug or remedy that may be ufed inftead of another; or that fupplies the place of another, of like virtue, which is not perhaps to be had: called alfo fuccedaneum.

SUBSTITUTION, in grammar, the ufing one word for another. This the grammarians otherwife call fyllepfis.

SUBSTITUTION, in the civil-law, a difpofition of a teftament, whereby the teftator fubftitutes one heir for another, who has only the ufufruit, and not the property of the thing left him. Subftitution is only a kind of fiduciary inheritance, called alfo fidei commiffio, in regard the immediate inheritor has only the ufe or produce of the thing; the body thereof being fubftituted and appropriated to certain perfons, who are likewife to have the ufufruit in their turns, but are never to have the property.

SUBSTITUTION, in algebra, &c. is the putting, in the room of any quantity in an equation, fome other quantity, which is equal to it, but expreffed in another manner.

SUBSTRACTION, or SUBTRACTION, in arithmetic, the fecond rule, or rather operation, in arithmetic, whereby we deduct a lefs number from a greater, to learn their precife difference.

Prob. I. To fubftract integers of like names, when the minuend, or number to be fubftracted from, is a greater than, or equal to, the fubducend, or that which is fubftracted.

Rule 1. Place the fubducend under the minuend, and draw a line under both. 2. Begin at the right hand; take the lefs from the greater, or equals from equals, and fet the difference of each row underneath.

Example in integers alone.

| | |
|---|---|
| Minuend | 638 |
| Subducend | 213 |
| Remainder | 425 |

The manner of operation.

| | | | | | |
|---|---|---|---|---|---|
| 3 | from | 8 | and there remain | 5 | which fet below. |
| 1 | | 3 | | 2 | |
| 2 | | 6 | | 4 | |

| | | | | | |
|---|---|---|---|---|---|
| That is, | 3 | from | 8 | remainder is | 5 |
| | 10 | | 30 | | 20 |
| | 200 | | 600 | | 400 |
| Therefore | 213 | | 638 | | 425 |

For fince the whole is equal to the fum of all its parts, therefore the fubftraction of all its parts is the fame with the fubftraction of the whole.

Examples in integers and parts.

| | | | |
|---|---|---|---|
| Minuend | 27° | 48′ | 36″ |
| Subducend | 12 | 31 | 24 |
| Remainder | 15 | 17 | 12 |
| Minuend | 146 l. | 18 s. | 6 d. |
| Subducend | 22 | 8 | 2 |
| | 124 | 10 | 4 |

Prob. II. To fubftract integers of the fame name or denomination, when fome of the minuend numbers are lefs than their inferior in the fubducend.

Rule 1. Place your numbers, and begin as before. 2. According to their refpective value, take one of the next denomination, out of which fubftract, and to the remainder add the minuend, fetting their fum underneath. 3. Then add what you took, to the next place, on the left hand, and fo proceed by this, or the former rule.

Example

Example in integers alone.

| | |
|---|---|
| From | 2537 |
| Subſtract | 1648 |
| Remainder | 889 |

The manner of operation.

| | | | | | | |
|---|---|---|---|---|---|---|
| 8 | from | 17 | remain | 9 | | which |
| 1 and 4=5 | from | 13 | remain | 8 | | ſet be- |
| 1 and 6=7 | from | 15 | remain | 8 | | low. |

| | | | | |
|---|---|---|---|---|
| That is 8 | from | 7+ 10 | remain | 9 |
| 10+ 40 | | 30+ 100 | | 80 |
| 100+ 600 | | 500+1000 | | 800 |
| 1000+1000 | | 2000+0000 | | 0000 |
| theref. 1648 | | 2537 | | 889 |

For by ſaying 8 from 17, I add 10 to the minuend; but I add alſo the ſame to the ſubducend, by ſaying 1 and 4 = 5, therefore the remainder muſt be the ſame.

The operation alſo may be thus:

| | | | | |
|---|---|---|---|---|
| 8 | from | 17 | remain | 9 units, |
| 4 | | 13—1 | | 8 tens, |
| 6 | | 15—1 | | 8 hundreds. |
| 1 | | 2—1 | | 0 |

| | | | | |
|---|---|---|---|---|
| That is 8 | from | 7+ 10 | remain | 9 |
| 40 | | 30+ 100— 10 | | 80 |
| 600 | | 500+1000— 100 | | 800 |
| 1000 | | 2000+0000—1000 | | 0000 |
| Therefore 1648 | | 2537 | | 889 |

For by adding a ten to the units, and taking it away from the tens, the value of the number is not changed.

Examples in integers and parts.

| | s. | d. | | s. | d. | | s. | d. |
|---|---|---|---|---|---|---|---|---|
| From | 5 | 3 | *i. e.* | 5 | 15 | or | 4 | 15 |
| Subſt. | 2 | 9 | | 3 | 9 | | 2 | 9 |
| Rem. | 2 | 6 | = | 2 | 6 | = | 2 | 6 |

| | l. | s. | d. | | l. | s. | d. |
|---|---|---|---|---|---|---|---|
| From | 246 | 3 | 4 | *i. e.* | 246 | 23 | 16 |
| Subſt. | 68 | 10 | 6 | | 69 | 11 | 6 |
| Rem. | 177 | 12 | 10 | = | 177 | 12 | 10 |

| | | | | |
|---|---|---|---|---|
| or | From | 245 l. | 22 s. | 16 d. |
| | Subſtract | 68 | 10 | 6 |
| | Remains | 177 | 12 | 10 |

Theorem. In ſubſtraction, the ſubducend together with the remainder, is equal to the minuend.

For all the parts taken together are equal to the whole. And if the ſubducend be taken from the minuend, there reſts the remainder. But if a part be taken from the whole, the remainder will be the other part: therefore the ſubducend, together with the remainder, are all the parts of the minuend, and conſequently equal to it.

Corollary. Hence addition and ſubſtraction ſerve reciprocally to prove each other. See the article ADDITION.

For addition and ſubſtraction are oppoſite in all caſes; and what is done by the one, is undone by the other.

| | | | |
|---|---|---|---|
| Thus, if to | 6 | And if from | 10 |
| be added | 4 | be ſubſtracted | 4 |
| Sum is | 10 | Remainder is | 6 |

That is, if 6+4=10, then 10—4=6.

SUBSTRACTION, in algebra, is performed by the following general rule.

Change the ſigns of the quantity to be ſubſtracted, into their contrary ſigns, and then add it, ſo changed, to the quantity from which it was to be ſubſtracted, by the rules of addition: the ſum ariſing by this addition, is the remainder.

For to ſubſtract any quantity, either poſitive or negative, is the ſame as to add the oppoſite kind. See ADDITION.

Examples.

| | | |
|---|---|---|
| From | $+5a$ | $8a-7b$ |
| Subſt. | $+3a$ | $3a+4b$ |
| Rem. | $5a-3a$, or $2a$ | $5a-11b$ |

| | |
|---|---|
| From | $2a-3x+5y-6$ |
| Subſtract | $6a+4x+5y+4$ |
| Rem. | $-4a-7x \quad 0-10$ |

It is evident, that to ſubſtract, or take away a decrement is the ſame thing as adding an equal increment. If we take away $-b$ from $a-b$, there remains $a$; and if we add $+b$ to $a-b$, the ſum is likewiſe $a$. In general, the ſubſtraction of a negative quantity is equivalent to adding its poſitive value. See the articles QUANTITY, CHARACTER, &c.

SUBSTYLAR LINE, in dialling, the line whereon the ſtyle, or gnomon, of a dial is duly erected. See DIAL and LINE.

SUBTANGENT *of a curve*, in the higher geometry, is the line T P (pl. CCLXII. fig. 3. n° 1.) which determines the interſection of the tangent T M, with the axis; or that determines the point wherein the tangent cuts the axis prolonged. See the article CURVE.

In any equation, if the value of the ſub-

tangent

tangent comes out poſitive, it is a ſign that the points of interſection of the tangent and axis fall on that ſide of the ordinate where the vertex of the curve lies, as in the parabola and paraboloids: but if it comes out negative, the point of interſection will fall on the contrary ſide of the ordinate, in reſpect of the vertex, or beginning of the abſciſſa; as in the hyperbola and hyperboliform figures. And univerſally, in all paraboliform and hyperboliform figures, the ſubtangent is equal to the exponent of the power of the ordinate, multiplied into the abſciſſa.

If C B (*ibid.* n° 2.) be an ordinate to A B, in any given angle, terminating in any curve A C, and A B $= x$, B C $= y$, and the relation between $x$ and $y$, that is, the nature of the curve, be expreſſed by this equation, $x^3 - 2xxy + bxx - bbx + byy - y^3 = 0$; then this will be the rule of drawing a tangent to it: multiply the terms of the equation by an arithmetical progreſſion; ſuppoſe, according to the dimenſions of $y$,

$x^3 - 2xxy + bxx - bbx + byy - y^3$; as
0 1 0 0 2 3

alſo according to the dimenſions of $x$, as, $x^3 - 2xxy + bxx - bbx + byy - y^3$;
3 2 2 1 0 0

the former product ſhall be the numerator, and the latter, divided by $x$, the denominator of a fraction expreſſing the length of the ſubtangent B D, which, in this caſe, will be

$$= \frac{-2xxy + 2byy - 3y^3}{3xx - 4xy + 2bx - bb.}$$

SUBTENSE, in geometry, the ſame with the chord of an arch. See CHORD.

Hence, the ſubtenſe of an angle is a right line ſuppoſed to be drawn between the two extremities of the arch that meaſures that angle.

SUBTERRANEOUS, or SUBTERRANEAN, appellations given to whatever is under-ground: thus, naturaliſts ſpeak of ſubterraneous fires, damps, &c. See the articles VULCANO, DAMP, &c.

Subterraneous bodies are more uſually called foſſils and minerals. See the articles FOSSILS and MINERALS.

SUBTILE, in phyſics, an appellation given to whatever is extremely ſmall, fine, and delicate; ſuch as the animal ſpirits, the effluvia of odorous bodies, &c. are ſuppoſed to be. See the articles ANIMAL SPIRITS, EFFLUVIA, &c.

*Materia* SUBTILIS, among the carteſians. See the article MATERIA SUBTILIS.

SUBTRIPLE RATIO, is when one number, or quantity, is contained in another three times: thus, 2 is ſaid to be ſubtriple of 6, as 6 is triple of 2.

SUBULARIA, in botany, a genus of the tetradynamia-ſiliculoſa claſs of plants, with a tetrapetalous, cruciform flower; its fruit is a ſmall bilocular pod, of an obverſely cordated figure, containing a few, very ſmall and roundiſh ſeeds.

SUBULATED, ſomething in the ſhape of an awl: thus, a ſubulated leaf is one of an oblong and narrow figure, broadeſt at the baſe, and thence gradually decreaſing, till it terminates in a point.

SUCCEDANEUM, in pharmacy, denotes a drug ſubſtituted in the place of another, in medical compoſition. See the articles MEDICINE and SUBSTITUTE.

SUCCENTURIATI RENES, in anatomy, the ſame with the capſulæ atrabiliariæ. See CAPSULÆ ATRABILIARIÆ.

SUCCESSION, *ſucceſſio*, in philoſophy, an idea which we get by reflecting on that train of ideas conſtantly following one another in our minds, when awake. See the article IDEA.

SUCCESSION, in law, implies a right to the whole effects left by a defunct.

SUCCESSOR, in law, one that ſucceeds, or comes in the place of, another.

It is held, that a ſole corporation may take an eſtate in fee to them and their ſucceſſors, but not without the word *ſucceſſors*: whereas an aggregate corporation may take a fee in ſucceſſion, without expreſſing the word *ſucceſſors*; and likewiſe may have goods and chattels in ſucceſſion. See CORPORATION.

SUCCINUM, AMBER, in natural hiſtory. See the article AMBER.

SUCCISA, in botany and pharmacy, a ſpecies of ſcabioſa, called by ſome morſus diaboli, devil's bit; and ſaid to be alexipharmic, but is little uſed in the preſent practice.

SUCCORY, *cichorium*, in botany, &c. See the article CICHORIUM.

SUCCOTRINE ALOES. See ALOES.

SUCCUBUS, a term uſed by ſome imaginary writers, for a dæmon who aſſumes the ſhape of a woman, and as ſuch lies with a man; in which ſenſe it ſtands oppoſed to incubus, which was a dæmon in form of a man, that they ſuppoſed to lie with a woman.

But the truth is, the ſuccubus is only a ſpecies of the incubus, or night-mare. See the article INCUBUS.

SUCCULA, in mechanics, a bare axis, or cylin-

cylinder, with ftaves to move it round; but without any tympanum or peritrochium.

SUCCULENT PLANTS, thofe whofe leaves are thick, and abound with juice. See the article PLANT.

SUCCUS, JUICE, in pharmacy. See the article JUICE.

SUCHUEN, a province of China, bounded by that of Xenfi on the north, by Honam and Huquam on the eaft, by Quecheu and Yunam on the fouth, and by the mountains of India on the weft: its chief town is Chingtu.

SUCK-FISH, *remora*, in ichthyology. See the article REMORA.

SUCKERS, in gardening, the fame with off-fets. See the article OFF-SETS.

SUCKING-PUMP. See PUMP.

SUCTION, *fuctio*, the act of fucking or drawing up a fluid, as air, water, milk, or the like, by means of the mouth and lungs.

There are many effects vulgarly attributed to fuction, which, in reality, have very different caufes. As when any one fucks water, or any other liquor, up through a pipe, it is commonly thought, that by that action the perfon draws the air up into his mouth, and that the water, which is contiguous to it, follows it by a kind of attraction, as if the air and water hung together; and others fancy, that the air moves into the mouth of the fucker, and the water moves up after the air, to prevent a vacuum, which, they fay, nature abhors: whereas the true caufe of this phænomenon is only, that the air and atmofphere preffes, with its whole weight, uniformly on the furface of the liquor in the veffel; and, confequently, prevents any one part of the water to rife higher than the other there: and if a pipe be put in, of any tolerable large bore, and be open at both ends, the water will rife within the pipe to the fame height as without, and, indeed, a little higher, becaufe the preffure of the air within the pipe is a little taken off by bearing againft the fides of the pipe. Now when any one applies his mouth to the upper end of the pipe, and fucks, his lips fo ftrongly inclofe the pipe, that no air can get between them and it; and, by the voluntary motion of the fpirits in the mufcles, the cavity of his thorax, or breaft, is opened and enlarged; by which means the air, included there, hath now a much larger fpace to dilate itfelf in, and, confequently, cannot prefs fo ftrongly againft the upper end of the pipe, as it did before the cavity of the thorax was fo enlarged, and when the weight of the whole atmofphere kept its fpring bent. And that weight or preffure being now taken off by the lips of the man that fucks, the equilibrium is deftroyed, the air gravitates on the furface of the water, but cannot do fo on the upper orifice of the pipe, becaufe the juncture of the lips takes it off; and the fpring of the air included in the thorax, being weakened by the dilatation of its cavity, it cannot prefs fo hard againft the upper orifice of the pipe, as the water will do againft the lower, and, confequently, the water muft be forced up into the pipe. It is much the fame thing in the fuction of a common pump: the fucker being tight, takes off entirely the preffure of the atmofphere on the furface of the water within the barrel of the pump; and, confequently, the atmofphere, by its weight, muft force the water up to make the equilibrium.

SUCULA, or SUCCULA. See SUCCULA.

SUDAMINA, little heat pimples in the fkin, like the millet-grains, frequent in youth, efpecially thofe of a hot temperament, and that ufe much exercife.

SUDATORY, *fudatorium*, a name given by the antient Romans to their hot or fweating-rooms; fometimes alfo called laconica. See the article BATH.

SUDBURY, a borough-town of Suffolk, thirteen miles fouth of Bury.

It fends two members to parliament.

SUDER-KOPING, a town of Sweden, in the province of Gothland, ninety miles fouth-weft of Stockholm.

SUDOR, SWEAT, in phyfiology. See the article SWEAT.

SUDOR ANGLICANUS, the SWEATING-SICKNESS, a difeafe fo called from its appearing firft in England, in the year 1483.

It feized different patients in different manners; for in fome it firft appeared with a pain in the neck, fcapula, legs, or arms; whilft others perceived only a kind of warm vapour, or flatulence, running through thofe parts. And thefe fymptoms were fuddenly fucceeded by a profufe fweat, which the patient could not account for. The internal parts became firft warm, and were foon after feized with an incredible heat, which thence diffufed itfelf to the extremities of the body. An intolerable thirft, reftleffnefs, and indifpofition of the heart,

liver, and ftomach, were the next fymptoms, which were fucceeded by an exceffive head ach, a delirium, in which the patient was very trifling and talkative; and after thefe, a kind of extenuation of the body, and an irrefiftable neceffity of fleeping.

For preventing this difeafe, temperance is ordered, and the choice of falutary aliments and drinks. No crude pot-herbs nor fallads are to be ufed, becaufe they may have received a noxious quality from the air; or, if they are ufed, they are to be previoufly wafhed with warm water.

SUDORIFIC, in pharmacy, an appellation given to any medicine that caufes or promotes fweat. See SWEAT.

Sudorific, perfpirative, and alexipharmic medicines, fays Dr. Shaw, make a large part of the common difpenfatories. A few medicines well chofen, might fupply the place of all thefe; and of thefe, the principal one would prove to be camphor, which trial will always fhew to be greatly fuperior to bezoar, Gafcoign's powder, lapis contrayerva, and the like. The fame gentleman gives the following eafy method of preparing a fafe and effectual fudorific: take an ounce of refined camphor, beat it in a marble-mortar, with two ounces of blanched almonds, till it be reduced to a fmooth and even pafte. This may be formed into pills, or bolufes, and given, according to the ftrength of the patient, and other confiderations, from three grains to forty.

SUET, *fevum*, or *febum*, in anatomy, the folid fat found in feveral animals, as fheep, oxen, *&c.* but not in the human fpecies. See the article FAT.

It is of the fevum that tallow is made. See the article TALLOW.

SUEZ, a port-town of Egypt, fituated at the bottom of the Red-fea, feventy miles eaft of Cairo: it is from this town that the ifthmus of Suez, which joins Africa to Afia, takes its name.

SUFFERANCE, or *Bill of* SUFFERANCE. See the article BILL.

SUFFITUS, in medicine, the fame with fumigation. See FUMIGATION.

SUFFOCATION, in medicine, the privation of refpiration, or breathing; which is fometimes occafioned by a congeftion of blood in the lungs, fo as to prevent the ingrefs of the air. See the articles ASTHMA, QUINZY, CATARRH, *&c.*

The fumes of wine, or other ftrong liquors, when boiling, likewife caufe fuffocation; as do the fumes of lime, charcoal, antimony, fulphur, vitriol, fpirit of nitre, *&c.*

SUFFOCATION *of the womb*, or *matrix*, is a difeafe pretty frequent in women, called alfo fits of the mother. See the article HYSTERIC.

In this the patient imagines a malignant vapour rifing from the matrix, and fo preffing againft the lungs and diaphragm, as to prevent the free motion neceffary to refpiration.

SUFFOCATIVE CATARRH. See the article CATARRH.

SUFFOLK, a county of England, bounded by Norfolk on the north, by the German fea on the eaft, by Effex, from which it is feparated by the river Maningtree, on the fouth, and by Cambridgefhire on the weft; being fixty-two miles long, and twenty-eight broad.

SUFFRAGAN, an appellation given to fimple bifhops, with refpect to archbifhops, on whom they depend, and to whom appeals lie from the bifhop's courts. See the articles ARCHBISHOP, BISHOP, COURT, *&c.*

Sometimes, indeed, the term fuffragan fignifies a co-adjutor, or affiftant-bifhop.

SUFFRAGE, *fuffragium*, denotes a vote given in an affembly, where fomething is deliberated on, or where a perfon is elected to an office or benefice.

SUFFRUTEX, among botanifts, denotes an under-fhrub, or the loweft kind of woody plants, as lavender, rue, *&c.*

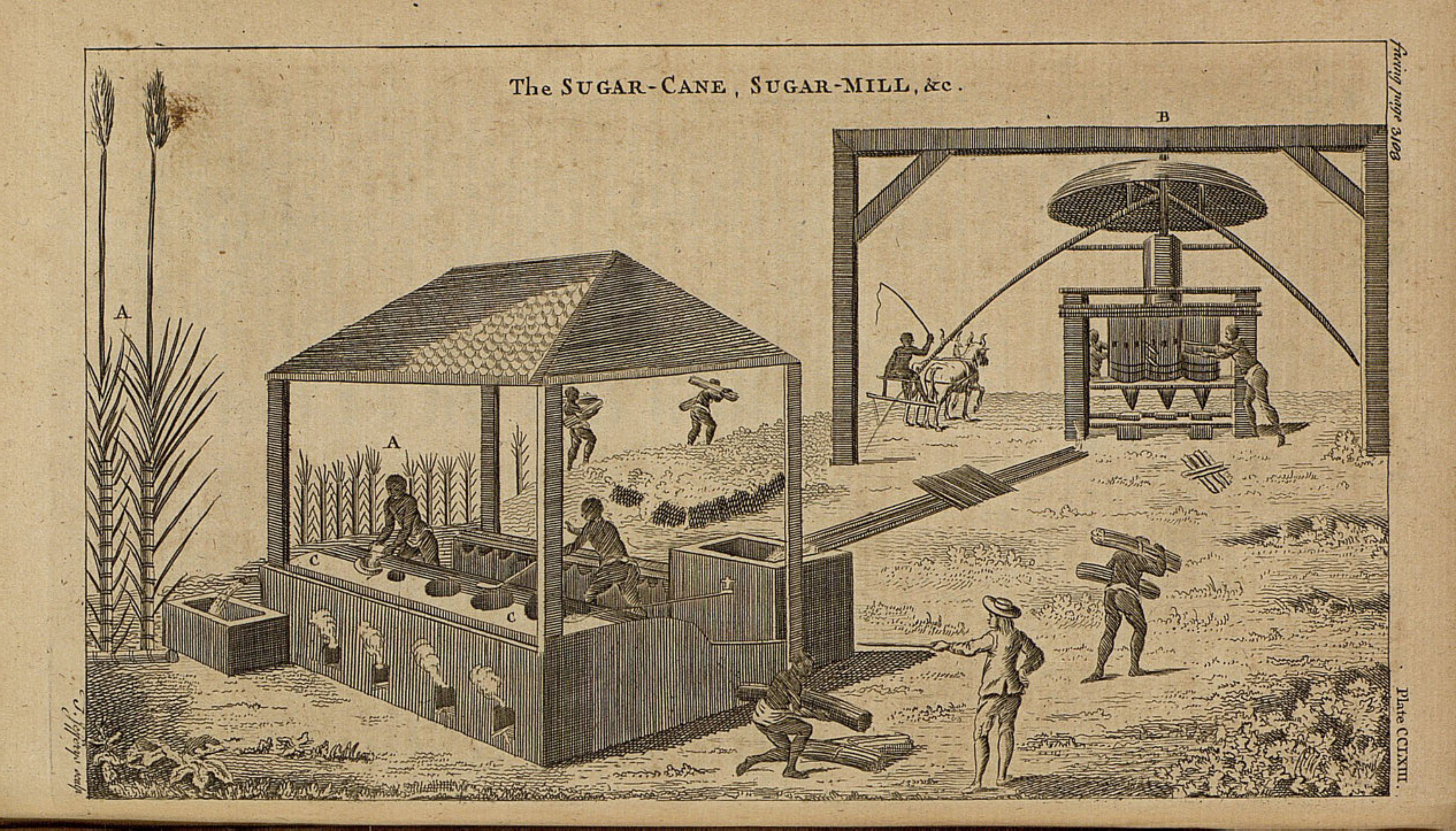
SUFFUMIGATION, or FUMIGATION. See the article FUMIGATION.

SUFFUSION, in medicine, the fame with a cataract. See CATARACT.

SUGAR, *faccharum*, in natural hiftory, is properly the effential falt of the fugar-cane, as tartar is of the grape.

The fugar-cane is a genus of the triandria-digynia clafs of plants, the corolla whereof is compofed of two valves, equal in fize, and without awns; they are of a lanceolated figure, hollowed, erect, and acuminated: there is no pericarpium; every flower containing within it a fingle, oblong, and acuminated feed.

This plant rifes to eight, nine, or more feet high; the ftalk, or cane, being round, jointed, and two or three inches in diameter at the bottom: the joints are three or four inches afunder, and in a rich foil more: the leaves are long and narrow, and of a yellowifh green colour; as is alfo the ftalk itfelf, the top of which is ornamented with a panicle, or clufter of arundinaceous flowers, two or three feet


The SUGAR-CANE, SUGAR-MILL, &c.
A
A
B
C
C
J. Jefferys sculp

in length. It grows ſpontaneouſly in many parts of the Eaſt-Indies, in the Canary-iſlands, and in the warmer climates of America. See plate CCLXIII. letters A, A.

They propagate the ſugar-cane, by planting cuttings of it in the ground in furrows, dug parallel for that purpoſe; the cuttings are laid level and even, and are covered up with earth; they ſoon ſhoot out new plants from their knots or joints; the ground is to be kept clear, at times, from weeds, and the canes grow ſo quick, that in eight, ten, or twelve months, they are fit to cut for making of ſugar from them. The manner of doing it is thus: they cut off the reeds at one of the joints near the roots; they are then cleared of the leaves, and tied up in bundles, and ſent to the mills, which are worked either by water or horſes. The ſugar-mill is compoſed of three rollers of an equal ſize, and all armed with iron-plates, where the canes are to paſs between them; only the middle roller is much higher than the reſt, to give the larger ſweep to the two poles to which the horſes are yoked. This great roller in the middle is furniſhed with a cog full of teeth, which catch the notches in the two ſide rollers, and force them about to bruiſe the canes, which paſs quite round the great roller, and come out dry and ſqueezed from all their juice; which runs into a veſſel or back under the mill, and is thence conveyed through a narrow ſpout into the firſt boiler, in the manner repreſented, *ibid.* let. B, C, C.

After the juice is let out of the firſt veſſel, it is received into another, in which it is boiled more briſkly, and ſcummed from time to time with a large kind of ſpoon, pierced with holes to let the liquor through, while it retains the ſcum and foulneſs ſeparated from it in boiling: towards the end of this boiling, they throw into it a ſtrong lixivium of wood-aſhes, with ſome quick-lime among it; this greatly promotes the ſeparation of the foulneſs that yet remains among it; and, after it has boiled ſome time with this addition, they ſtrain it off. The fæces left in the cloths make a kind of wine, when fermented properly with water. The ſtrained liquor, which is now tolerably clean, is let into a third boiler, in which it is boiled down to the conſiſtence of ſugar over a very briſk fire, the people who attend it continually ſtirring and ſcumming it.

Great caution is to be uſed that the boiling matter does not riſe over the ſides of the veſſel, which would be of very dangerous conſequence: they prevent this by taking up quantities of the boiling matter with a ladle, lifting it up high, and letting it run in again, and by now and then adding a ſmall piece of butter, or fat of ſome kind, which takes down the bubbling almoſt inſtantaneouſly. They are very careful that no lemon-juice, or any other acid of that kind, comes near the veſſels, a very ſmall admixture of that being ſufficient to keep the matter from granulating. When the liquor is boiled enough, which is known by its concreting, on throwing a ſpoonful of it up into the air, it is then let out into a fourth veſſel, under which there is a very gentle fire, only kept up that it may have leiſure to granulate; when it has begun to granulate, it is let out of this laſt boiler into a kind of conic earthen veſſels, open at both ends; the wideſt aperture is placed upwards, and the ſmaller end downwards, its aperture being ſtopped with a wooden plug. It is left in theſe veſſels twenty-four hours to concrete: after this they are removed into ſugar-houſes, and are there arranged in regular order, with a veſſel of earthen-ware under each; the plug is then taken out of the bottom aperture of each, and they are left in this condition for about forty days, that all the thick liquor, or melaſſes, may run from them: after they have ſtood thus long to drain of themſelves, a quantity of clay is diluted, with water, into a thin paſte, and this is poured on the top of every parcel of ſugar in the veſſels, ſo as to cover it two or three inches deep. This water, by degrees, all leaves the clay, and penetrating into the maſs of ſugar, runs through it, and carries off yet more of this foul thick liquid with it, into the veſſels placed underneath to receive it.

When the clay is quite dry, it is taken off, and the firſt preparation of the ſugar is now finiſhed; they ſhake it out of the veſſels, and, cutting it into lumps, which are of a dirty, browniſh, or greyiſh colour, they put it up in hogſheads, and other caſks, under the name of grey or brown ſugar. The ſugar, in this ſtate, ought to be dry, not unctuous, and to have no taſte of burning. The liquor which has run from the ſugar in ſtanding, is boiled to a conſiſtence, and ſold under the name of melaſſes, or treacle; this

this affords, by fermentation, a very clean and good ſpirit. See MELASSES.

This coarſe ſugar is afterwards refined to various degrees of purity by new ſolutions, and is ſold at different prices, and under different names, according to the degree of purity it is brought to. Our ſugar refiners firſt diſſolve it in water, then clarify the ſolution by boiling with whites of eggs and deſpumation; and after due evaporation pour it into moulds; where the fluid part being drained off, and the ſugar concreted, its ſurface is covered with moiſt clay, as before. The ſugar thus once refined, by repetition of the proceſs, becomes the double refined ſugar of the ſhops. The candy-ſugar, or that in cryſtals, is prepared by boiling down ſolutions of ſugar to a certain pitch, and then removing them into a hot room, with ſticks placed acroſs the veſſel for the ſugar to ſhoot upon: and theſe cryſtals prove of a white or brown colour, according as the ſugar uſed in the proceſs was pure or impure.

A pound of ſugar purified to the higheſt degree, and diſtilled in a retort, yields firſt about half an ounce of a limpid, inſipid phlegm, without ſmell; and after this comes over a liquor, at firſt limpid and colourleſs, afterwards reddiſh, and, finally, of an empyreumatic ſmell, in quantity not leſs than ſix ounces; this is partly of an acid, partly of an alkaline and urinous taſte; after this comes over a thick and reddiſh oil, in quantity about three drachms; and then more than an ounce of a brown oil of a thicker conſiſtence. The remainder in the retort, calcined and lixiviated, yields a drachm of a pure alkaline ſalt.

Sugar is a true ſalt, and when perfectly pure, after ſolution, it concretes into regular cryſtals; theſe are of a priſmatic figure, and conſiſt of eight plain ſurfaces, in two of which the oppoſite baſes are equal and parallel, the reſt are parallelograms. In its natural ſtate, it manifeſts not the leaſt token of any thing, either acid or alkaline. It is inflammable, in a great degree, burning with a very briſk white flame. It diſſolves, with the utmoſt readineſs, in all aqueous menſtruums, but very difficultly in ſpirituous or oily liquors: mixed with water, it, after a time, ferments, and acquires a vinous flavour; and at this time an inflammable ſpirit, like that of wine, may be drawn from it in a conſiderable quantity. Many other plants and trees might be found which would yield ſugar: thus ſeveral ſpecies of maples afford a juice which boils into good ſugar. But the great quantity of it yielded by the ſugar cane, and its eaſy culture, renders it unneceſſary to look farther after what it ſo abundantly ſupplies us with.

The uſes of ſugar, as a ſweetner, are ſufficiently known: it promotes the union of diſtilled oils with watery liquors, and prevents the ſeparation of the butyraceous parts from milk; and hence it is ſuppoſed to unite the unctuous part of the food with the animal juices. Sugar is not only innocent, but reconciles to the palate and ſtomach ſubſtances of themſelves diſguſtful to both; and the impure ſorts, in conſequence of their containing an unctuous or oily matter, prove emollient and laxative. The cryſtals are the moſt difficult of ſolution; and conſequently are moſt proper, where this lubricating ſweet is wanted to diſſolve ſlowly in the mouth.

The medicinal preparations of ſugar are,

1. Sugar of roſes, *ſaccharum roſaceum*, thus made: take of red roſe buds, freed from the heels, and haſtily dried, one ounce; and of double refined ſugar, one pound: reduce them ſeparately into powder, then mix and moiſten them with water, that they may be formed into troches, which are to be dried with a gentle heat.

2. Red ſugar of roſes, *ſaccharum roſatum rubrum*, is made thus: take of white ſugar, one pound; juice of red-roſes, four ounces; and red-roſes dried, one ounce: boil the ſugar and juice over a gentle fire, till the juice is almoſt all evaporated; then throw in the dry roſes reduced to a very fine powder. Pour out the matter upon a marble, and form it into lozenges according to art.

Theſe preparations are chiefly valued for their agreeableneſs to the eye and palate: ſome likewiſe eſteem them, medicinally, as light reſtringents; and look upon them, not undeſervedly, as an excellent addition to milk, in phthiſical and hectic caſes. Some have been accuſtomed to add a portion of acid, which improves their colour, but at the ſame time renders them leſs proper to be uſed with milk.

3. Barley-ſugar, *ſaccharum hordeatum ſeu penidiatum*, is made by boiling white ſugar in barley-water, *i. e.* a decoction of barley, till it acquires ſuch a conſiſtence, as that it may be drawn out, and twiſted

twisted into threads or strings: this is rarely prepared by the apothecaries, or considered as a medicine.

SUGAR *of lead, saccharum saturni.* See the article SACCHARUM.

SUGILLATION, in medicine, an extravasation of blood in the coats of the eye, which at first appears of a reddish colour, and afterwards livid or black. If the disorder is great, bleeding and purging are proper, as are discutients. The following cataplasm is said to be very good: Take of comfry-root, six ounces; of solomon's seal, two ounces; of elder-flowers, one ounce and a half; of bean-flour, one ounce; let all these be boiled in a sufficient quantity of spring-water. The decoction may be used as a fotus, and the ingredients for a cataplasm.

SUIT, in law, is used in different senses, as, 1. For an action, whether personal or real. 2. Suit of court, or suit-service, which is an attendance the tenant owes to his lord's court. 3. Suit-covenant, where a person has covenanted to do service in the court of the lord. 4. Suit-custom, which is where one and his ancestors have owed suit time out of mind. 5. It is used for a petition to the king, or any person of dignity; where a lord distrains his tenant for suit, and none is due; in this case, the party may have an attachment against him to appear in the king's court. 6. Suit of the king's peace, is an action brought against a person for breach of the king's peace; as in the case of treasons, felonies, or trespasses. See ACTION, COURT, &c.

SUIT-SILVER, a small sum paid in some manors, to excuse the appearance of freeholders at their lord's courts. See the article COURT.

SULDY, a town of France, situated on the river Loire, twenty miles south-east of Orleans.

SULMONA, or SOLMONA, a town of the hither Abruzzo, in the kingdom of Naples: east long. 15°, north lat. 42° 6′.

SULPHUR, in natural history, a genus of fossils, defined to be dry, solid, but friable fossil bodies; melting with a small heat, when fired in the open air; burning almost wholly away with a blue flame, and noxious vapour; and indued with an electric power, and not dissoluble in acids.

Some have used the word sulphur as a name for the whole series of inflammable bodies, but as we have also been used to distinguish those of a particular kind by the same name, it seems much more eligible to restrain that name to those bodies, and to give some other for the more general classes.

The word sulphur, in this acceptation, becomes the name of a regular genus of fossils, of which there are four known species. 1. The yellow native sulphur, which in its purest state is of a pale straw colour, and as pellucid as the finest amber; but is more frequently found coarser, and more opake. It is found in the gold mines of Peru, in Hungary, and in some other places. 2. The green native sulphur. This is harder than the other, and is usually found in small masses composed of several crusts. It is found, so far as is yet known, only about mount Vesuvius. 3. The grey native sulphur, which is common in Iceland, and many other places, and is the coarsest and worst of all the kinds. And, 4. the most rare and beautiful of all the kinds, the red native sulphur. This is of a fine glowing red, like cinnabar, and very bright and transparent, and is found, so far as is yet known, only in the gold mines of Peru.

But besides these native kinds of sulphur, there is a factitious sort, by far the most common in the shops, separated from extraneous matters by means of fire. It is sometimes met with in very large masses, and called sulphur in the cake; but what we most frequently see of it is in oblong cylindric rolls of a yellow colour, sometimes with, and sometimes without, an admixture of greenish. The yellow contains less, the greenish more, of the vitriolic salt mixed with it; it is friable, and affords a sort of crackling noise, when rubbed between the fingers; it is very easily reduced to powder, and melts with a small degree of heat. It may be totally sublimed, in a close vessel, without alteration. It takes fire on being brought into contact with a burning coal, or any ignited matter; and when pure and genuine, for we are liable to great cheats in regard to it, it does not burn away very quickly, but continues a considerable time, emitting a deep blue flame. It is to be chosen for internal use of the purest and brightest yellow, light, easily broken, and appearing very bright and glossy where it breaks. If it be for making oil of sulphur, the greenish rolls are the best, as containing most acid.

This kind of sulphur is separated, by

means of fire, from various minerals, which are found naturally to contain it. The greateſt part of what we have, is made from the common vitriolic pyrites, the ſame mineral yielding both ſulphur and vitriol, and often alum. They firſt give it a degree of fire ſufficient to melt the ſulphur it contains, and, when this is all run out into veſſels prepared to receive it, they expoſe the remaining matter to the air, after which they boil it in water, and obtain from the lixivium the common green vitriol or copperas; and after all this is obtained, by adding an alkali to the ſame liquor, they get alum from it. See VITRIOL and ALUM.

Sulphur, under whichever of theſe forms it appears, is ſtill the ſame in all its characters; it diſſolves in oils, and alkaline ſubſtances; it grows red when melted but turns yellow again when it cools; it affords an acid, the ſame with that of vitriol, if its fumes in burning be catched in a proper manner; but it will not yield this acid by the common way of diſtillation.

Sulphur, melted with gold, provided that metal be pure, makes no ſort of alteration in it; but this is the only metal that eſcapes its effects. Thrown upon ſilver heated red hot, the metal immediately melts, and, if taken from the fire as ſoon as it does ſo, it will be found, when cold, to reſemble lead rather than what it really is. It retains its malleability perfectly, and cuts eaſily with a knife; but it is of a dull bluiſh colour. It is, however, eaſily reduced again to its proper appearance; for there requires no more to this, than the keeping it a few minutes in a ſtrong fire to burn away the ſulphur. If the heat is ſlackened towards the end of this fuſion, the ſilver will not fall into one uniform maſs, but will riſe up in ſmall ſprings all over the ſurface in a very beautiful manner, reſembling the branches of ſilver, ſometimes ſeen on the ſurface of ores. Tin melted with brimſtone, if the metal be firſt granulated, and the brimſtone added in powder in three times its quantity, deflagrates as if nitre had been mixed with it. The remainder becomes ſolid, while yet in the fire, and, when cold, is a brittle regulus of the colour of lead, and greatly reſembling a ſemi-metal in its qualities. Tin may indeed be wholly turned into ſcoria by burning it with additional parcels of ſulphur. Sulphur melted along with lead deſtroys its malleability, as much as it does that of tin. It becomes hard and rigid, and very difficult of fuſion, and loſes the appearance of lead; being, in the regulus thus obtained, compoſed of broad, bright, and glittering particles. Copper melts immediately upon being made red-hot, if brimſtone be added to it; and becomes a black friable ſubſtance. Iron of all other metals melts the moſt freely and readily with the ſulphur, but it does not freely part with it again. A red-hot iron applied to a roll of ſulphur immediately throws off particles diſſolved by the ſulphur into a ſpongy ſcoria. Regulus of antimony melted with ſulphur returns to common crude antimony again. Bizmuth melted with it aſſumes the appearance of antimony, and inſtead of broad flakes is found to be compoſed of needles or ſtriæ running acroſs one another. Zink ſuffers leſs change from it, and mixes indeed leſs eaſily with it; it at length becomes darker-coloured, and more brittle.

*Uſes and preparations of* SULPHUR. Beſides the great uſe of ſulphur in medicine, chemiſtry, metallurgy, and the making of gun-powder, it is of great ſervice for whitening ſilks, and woollen ſtuffs; for which purpoſe, its vapour is contrived to be received by them: its vapour alſo whitens red roſes; and even young rooks, taken out of their neſts, and expoſed thereto, become perfectly white: it has alſo the ſame effect upon gold, which may be reſtored to its colour, by boiling it in water with tartar: and, laſtly, its fumes check and prevent fermentation; on which account, it is much uſed by wine-coopers.

As to the medicinal virtues of ſulphur, it is given, in its crude ſtate with great ſucceſs in diſeaſes of the lungs. It ſtrengthens and cleanſes them, and promotes expectoration, and has at all times been famous for its virtues againſt cutaneous diſeaſes. It generally proves a little looſening to the bowels, and increaſes the diſcharges by perſpiration; it even communicates its ſmell to the perſpired matter for a conſiderable time after taking it, and will often blacken gold or ſilver that is worn by people who take any conſiderable quantity of it.

The preparations of ſulphur, in moſt frequent uſe in the ſhops, are, 1. Flowers of ſulphur, *flores ſulphuris*, a good pectoral medicine. See the article FLOS. 2. Precipitated ſulphur, commonly called milk of ſulphur, made by boiling flowers of

of sulphur, with thrice their weight of quick lime, till the sulphur is dissolved; and then filtering the solution through paper, let a precipitation be made with weak spirit of vitriol; and lastly, by washing the precipitated powder found at the bottom of the vessel, till it becomes quite insipid. This is good in all uses, wherein sulphur in substance, or its flowers, are used; its dose being from ten grains to two scruples. 3. Balsam of sulphur is made by boiling flowers of sulphur in four times their weight of oil of olive, in a pot lightly covered, till the oil and sulphur are united into the consistence of a balsam: and in the same manner may a balsam of sulphur be prepared with barbadoes-tar. This, though highly extolled as a pectoral by some authors, ought to be given with great caution; since its acrimony must render it injurious to weak lungs. 4. Spirit or oil of sulphur is an acid, obtained by retaining in any manner the vapours of burning sulphur; it is wholly the same with that of vitriol; being an agreeable acid, and good in every case in which the spirit of vitriol is so. 5. Sulphurated water, *aqua sulphurata*, is made thus: take common water one quart, of pure sulphur half a pound, set a part of the sulphur on fire in an iron ladle, and suspend it in that state over the water in a close vessel; let the remainder of the sulphur be afterwards fired and suspended in the same manner, and when the operation is over, the water will have acquired a sharp acid taste, and is to be reserved for use. The most commodious vessel for making this is a large glass receiver fitted with a wooden plug, into which the handle of the ladle may be fixed; as soon as the sulphur is fired, the ladle is to be thrust so far into the receiver, that the plug may come to stop the aperture, and the covering the mouth over this with a wet cloth will be sufficient to keep in the fumes.

This is the liquor called by some authors *gas sulphuris*; it is an agreeable acid, and is good in malignant and petechial fevers, given in the common drink. It quenches thirst, and cools the mouth and tongue.

SULPHUR-WORT, in botany, a name by which some call peucedanum. See the article PEUCEDANUM.

SULTAN, or SOLDAN, a title of honour, given to the emperor of the Turks. The wife of a sultan is called sultana, and the favourite one bhaseki-sultana, *i. e.* the private sultana.

SULTZBACH, or SULTSBACH, a city of Bavaria, thirty-two miles north of Ratisbon, subject to the duke of Neuburg.

SUM, SUMMA, in mathematics, signifies the quantity that arises from the addition of two or more magnitudes, numbers, or quantities together. See ADDITION.

The sum of an equation is, when the absolute number being brought over to the other side of the equation, with a contrary sign, the whole becomes equal to 0: thus, the sum of the equation $x^3 - 12x^2 + 41x = 42$, is $x^3 - 12x^2 + 41x - 42 = 0$. See EQUATION.

SUMACH, *rhus*, and *cotinus*, in botany. See the article COTINUS.

The seeds, or berries, of the common sumach, are moderately astringent; and have formerly been prescribed in this intention, but are now unknown in the shops. Their chief use, at present, is in the preparation of morocco, and other leather. See MOROCCO and LEATHER.

SUMATRA, an island in the East-indian ocean, situated between 93° and 104° east long. and between 5° 30′ north lat. and 5° 30′ south lat. extending from north-west to south-east, nine hundred miles long, and from one hundred to one hundred and fifty broad.

SUMEREIN, a town of lower Hungary, fifteen miles south of Presburg, subject to the house of Austria.

SUMMARY, in matters of literature, the same with abridgment. See the article ABRIDGMENT.

Summary, however, is often used for a table of contents, placed at the beginning of books, to shew the principal heads treated of therein. See BOOK.

SUMMATORIUS CALCULUS, in mathematics. See the article CALCULUS.

SUMMER, one of the seasons of the year, commencing in these northern regions on the day the sun enters Cancer, and ending when he quits Virgo. Or, more strictly and universally, the summer begins on the day when the sun's meridian distance from the zenith is the least; and ends on the day, when his distance is a mean betwixt the greatest and smallest. The end of summer coincides with the beginning of winter. See SEASONS.

SUMMER, in architecture, is a large stone, the first that is laid over columns and pilasters, in beginning to make a cross vault;

vault; or it is the ftone which, being laid laid over a piedroit or column, is hollowed to receive the firft haunce of a platband.

SUMMER, in carpentry, is a large piece of timber which being fupported on two ftone piers or pofts, ferves as a lintel to a door, window, *&c.*

SUMMIT, the top or vertex of any body, or figure; as of a triangle, cone, pyramid, *&c.* See TRIANGLE, CONE, *&c.*

SUMMITS *of flowers*, the fame with the antheræ, or apices. See ANTHERÆ.

SUMMONS, in law, a citing or calling a perfon to any court, to anfwer a complaint, or even to give in his evidence.

There muft always be a fummons in real actions, whereby the fheriff warns the party to appear at a day on the tenants land; alfo fourteen days before the return, proclamation is to be made thereof, in order that the grand cape may iffue.

SUMPTUARY LAWS, *leges fumptuariæ*, are laws made to reftrain excefs in apparel, coftly furniture, eating, *&c.*

SUN, *fol*, ⊙ in aftronomy, the great luminary which enlightens the world, and by its prefence, conftitutes day. See the articles DAY and DIURNAL.

The fun is the principal fource of heat upon the earth's furface, and the confines of the earth and atmofphere: without this, fays Dr. Shaw, all the bodies upon our globe would doubtlefs grow fixed, rigid and lifelefs; it being the folar heat that ftirs within them, as the main fpring of their actions; caufing all the operations in the animal, vegetable, and mineral kingdoms; and hence alfo, the ocean and atmofphere continue in a fluid ftate. See FIRE and HEAT.

Sir Ifaac Newton, in his optics, gives good reafons to fuppofe the fun and fixed ftars to be great earths vehemently hot; whofe heat is conferved by the greatnefs of their bodies, and the mutual action and re-action between them and the light which they emit; and whofe parts are kept from fuming away, not only by their fixity, but alfo by the vaft weight and denfity of the atmofpheres incumbent on them, and every way ftrongly compreffing them, and condenfing the vapours and exhalations which arife from them. The light feems to be emitted from the fun and fixed ftars (which probably are funs to other fyftems) much after the manner as iron, when heated to fuch a degree as to be juft going into fufion, by the vibrating motion of its parts, emits, with force and violence, copious ftreams of liquid fire all around. Great bodies muft preferve their heat longeft, and that, perhaps, in the proportion of their diameters. See the article STAR.

The fun, then, may be conceived to be a huge body of fire, whence all the planets receive their light; and by the emanation of whofe rays and beams of light, the whole fyftem of beings about us is illuminated and rendered vifible.

In order to compute the diameter, and bulk, or folid content, of the fun, its diftance from the earth muft be firft known by means of the horizontal parallax; to find which, aftronomers have attempted a variety of methods, but have as yet found none that will determine it exactly: however, by many repeated obfervations of Dr. Halley, it is found to be not greater than 12″, nor lefs than 9″. Wherefore 10 ½″ (the mean) has been fixed upon as near the truth, but upon June the 6th 1761, during a tranfit of Venus over the fun's difk, aftronomers had an opportunity of determining the fun's horizontal parallax with great exactnefs, nay to within a five-hundredth part of the whole, according to a method pointed out by Dr. Halley; and in confequence of obfervations made during that tranfit, the fun's parallax has been determined at 8″, 69. See Phil. Tranf. vol. LII. part II. p. 611. & feq. and Phil. Tranf. n° 348, abridged by Jones, vol. IV. See PARALLAX.

Suppofing, then, the fun's horizontal parallax to be 10″, its diftance will be found to be 82136014 britifh miles: and having a double convex lens, as L, (plate CCLXII. fig. 8.) whofe focus of parallel rays is at C D, 12 feet, or 144 inches, diftant from itfelf: let this lens be fixed in the window fhutter of a darkened room, to receive the fun's rays A L, B L, which coming from the extreme parts of the fun's body, and interfecting each other in the center of the lens, will determine the diameter of the fun's image at C D; which, being nicely meafured, will be found $1\frac{34}{100}$ of an inch, the half of which is $Ce = \frac{67}{100}$ of an inch. Then fay,

| | | | |
|---|---|---|---|
| As the focal diftance | CL = | 144 = | 2.158362 |
| To ½ the diameter of the image | Ce = | 0. 67 = | 0.173925 |
| So is the radius | R = | 90°00′ = | 10.000000 |
| To the fine of the angle | CLe = | 00°16′ = | 7.667713 |

There-

Therefore, the whole angle CLD (= ALB) = 32′, which is the ſun's apparent diameter, or that under which its diameter appears to the eye.

| | | |
|---|---|---|
| As the diſtance of the image | C L = 144 | = 2.158362 |
| To its diameter | C D = 1.34 | = 0.127105 |
| So is the diſtance of the ſun L A = | 82136014 | = 7.914533 |
| To the ſun's diameter, A B = | 764320 | = 5.883276 |

Hence the diameter of the ſun is found to be 764,320 engliſh miles; though by other computations, its diameter is found to be only 763,460 miles, and its diſtance from our earth 81,000,000 of miles. See the articles DISTANCE and DIAMETER, under the laſt of which articles its leaſt mean and greateſt apparent diameters may be ſeen, both according to de la Hire and Hevelius.

The quantity of matter in the ſun, compared with that of the earth, has already been taken notice of under EARTH.

From what has there been ſaid, it follows, that the common center of gravity, of the ſun and jupiter, is nearly in the ſuperficies of the ſun; of ſaturn and the ſun a little within it. And by calculation it is found that the common center of gravity of all the planets cannot be more than the length of the ſolar diameter diſtant from the center of the ſun: this common center of gravity is proved to be at reſt; and therefore, though the ſun, by reaſon of the various poſition of the planets, may be moved every way, yet it cannot recede far from the common center of gravity. And this it is thought ought to be accounted the center of our world. See the articles COPERNICAN, SYSTEM, CENTER, &c.

By means of the ſolar ſpots it hath been diſcovered, that the ſun revolves round his own axis, without moving (conſiderably) out of his place, in about twenty-five days. And that the axis of this motion is inclined to the ecliptic, in an angle of 87 degrees, 30 minutes, nearly. See MACULÆ and FACULÆ.

The ſun's apparent diameter being ſenſibly ſhorter in December than in June, as is plain and agreed from obſervation, the ſun muſt be proportionably nearer to the earth in winter than in ſummer; in the former of which ſeaſons will be the perihelion, in the latter the aphelion: and this is alſo confirmed by the earth's moving ſwifter in December than it doth in June. For ſince, as Sir Iſaac Newton hath demonſtrated, the earth always deſcribes equal areas in equal times, whenever it moves ſwifter, it muſt needs be nearer to the ſun. And for this reaſon there are about eight days more from the ſun's vernal equinox to the autumnal, than from the autumnal to the vernal.

Now ſince the diameter of any object and its image, are proportional to their diſtances from the lens, the real diameter may be found by the following analogy:

For the apparent annual motion round the earth, ſee the article EARTH.

If you divide 360 degrees (*i. e.* the whole ecliptic) by the quantity of the ſolar year, it will quote 59 minutes 8 ſeconds, *&c.* which therefore is the quantity of the ſun's diurnal motion. And, if this 59 minutes 8 ſeconds be divided by 24, you have the ſun's horary motion, which is 2 minutes 28 ſeconds; and, if you will divide this laſt by 60, you will have this motion in a minute, *&c.* And this way are the tables of the ſun's mean motion, which you have in the books of aſtronomical calculation, conſtructed.

For eclipſes of the ſun, cycle of the ſun, maculæ and faculæ of the ſun, *&c.* ſee ECLIPSE, CYCLE, *&c.*

SUN-FISH, *mola,* in ichthyology. See the article MOLA.

SUN-FLOWER, in botany. See the articles HELIANTHUS and HELIANTHEMUM.

*Dwarf* SUN-FLOWER, *rudbeckia,* in botany. See RUDBECKIA.

SUN-DEW, *ros ſolis.* See ROS.

SUNDA-ISLANDS, thoſe ſituated near the ſtraits of Sunda, in the indian ocean; the chief of which are Borneo, Java, Sumatra, *&c.* See BORNEO, *&c.*

SUNDAY, or the LORD's-DAY, a ſolemn feſtival obſerved by Chriſtians on the firſt day of every week, in memory of our Saviour's reſurrection.

This is the principal and moſt noted of the chriſtian feſtivals, and was obſerved with great veneration in the antient church, from the time of the apoſtles, who themſelves are often ſaid to have met on that day for divine ſervice. It is likewiſe called the ſabbath-day, as being ſubſtituted in the room of the jewiſh ſabbath. See the article SABBATH.

The antients retained the name Sunday, or *dies ſolis,* in compliance with the ordinary forms of ſpeech, the firſt day of the week being ſo called by the Romans, becauſe it was dedicated to the worſhip of the ſun.

Befides that the moft folemn parts of the chriftian worfhip were always performed on fundays, this day was diftinguifhed by a peculiar reverence and refpect expreffed towards it in the obfervation of fome fpecial laws and cuftoms. Among thefe, we may reckon in the firft place, thofe imperial laws which fufpended all proceedings at law upon this day, excepting only fuch as were of abfolute neceffity, or eminent charity; fuch as the manumiffion of flaves, and the like. Neither was it only the bufinefs of the law, but all fecular and fervile employments were fuperfeded upon this day, ftill excepting acts of neceffity and mercy. Another thing which the chriftian laws took care of, to fecure the honour and dignity of the lord's-day, was, that no ludicrous fports or games fhould be followed on this day; but all fuch recreations and refrefhments as tended to the prefervation or conveniency of life were allowed of; and therefore, funday was always a day of feafting, and it was not allowable to faft thereon, not even in Lent. The great care and concern of the primitive Chriftians in the religious obfervation of the lord's-day, appears firft from their conftant attendance upon all the folemnities of public worfhip, from which nothing but ficknefs, imprifonment, banifhment, or fome great neceffity could detain them. Secondly, from their zeal in frequenting religious affemblies on this day, even in times of the hotteft perfecution, when they were often befet and feized in their meetings and congregations. Thirdly, from their ftudious obfervations of their vigils or nocturnal affemblies that preceded the lord's-day. Fourthly, from their eager attendance on fermons, in many places, twice upon this day, and their conftant reforting to evening prayers, where there was no fermon. Laftly, from the fevere cenfures inflicted on thofe who violated the laws concerning the religious obfervation of this day, fuch perfons being ufually punifhed with excommunication, as appears from the apoftolical conftitutions, and the canons of feveral councils. In the romifh breviary, and other offices, we meet with a diftinction of fundays, into thofe of the firft and fecond clafs; Sundays of the firft clafs are, Palm-funday, Eafter-funday, Advent, Whitfunday, *&c.* thofe of the fecond clafs are the common fundays of the year. See the articles PALM-SUNDAY, EASTER-SUNDAY, *&c.*

By our laws, no perfon is to do any wordly labour on this day, which is fet apart for the fervice and worfhip of God, except works of neceffity and charity, under the penalty of five fhillings. And if any perfon cry, or expofe to fale any wares, or goods on a Sunday, the fame will be forfeited to the poor, *&c.* the offender being convicted thereof before a juftice of the peace, *&c.* who is authorifed to caufe the penalties and forfeitures to be levied by diftrefs. Yet this extends not to dreffing of meat, nor to the crying or felling of milk in the morning or evening, or the felling of mackrel on that day. The funday is not a day in law, fo that no procefs lies, or may be ferved thereon, except for treafon or felony, or on an efcape. A fale of goods, or contract made on a funday, is deemed void.

For the funday-letter, or that letter of the alphabet which points out in the calendar the fundays throughout the year, fee DOMINICAL LETTER.

SUNDERLAND, a port town of Durham, fituated on the German Sea, at the mouth of the river Ware, ten miles north eaft of Durham city.

SUNDERLAND, or SUDERMANIA, a province of Sweden, bounded by the Meller Lake, which divides it from Uplandia, on the north; by the Baltic Sea on the eaft; and by Gothland on the fouth and weft.

SUNNEBERG, a town of Germany, in the circle of Upper Saxony, and marquifate of Brandenburg, fituated fifty miles north-eaft of Berlin.

SUNTGOW, a territory in the circle of the upper Rhine in Germany, bounded by Alface on the north; by the river Rhine, which divides it from the Brifgow, on the eaft; by Switzerland on the fouth, and by Franche-Compte on the weft.

SUOVETAURILIA, an antient roman facrifice, fo called becaufe it confifted of a pig (*fus*), a fheep, or rather ram (*ovis*) and a bull (*taurus*). They were all males, to denote the mafculine courage of the roman people. It was likewife called folitaurilia, becaufe the animals offered up were always (*folida*) whole or uncut.

SUPERBIPARTIENS. See RATIO.

SUPERCARGO, a perfon employed by merchants to go a voyage, and overfee their

their cargo, or lading, and diſpoſe of it to the beſt advantage. See the articles CARGO, FACTOR, &c.

SUPERCILIUM, in anatomy, the eye-brow. See the article EYE-BROW.

SUPERCILIUM, in the antient architecture, the uppermoſt member of the corniche, called by the moderns corona, crown, or larmier.

It is alſo uſed for a ſquare member, under the upper tore in ſome pedeſtals; ſome authors confound it with the tore itſelf. See the article TORE.

SUPEREROGATION, in theology, what a man does beyond his duty, or more than he was commanded to do. The Romaniſts ſtand up ſtrenuouſly for works of ſupererogation, and maintain, that the obſervance of evangelical councils is ſuch. By means hereof, a ſtock of merit is laid up, which the church has the diſpoſal of, and which ſhe diſtributes in indulgences to ſuch as need. The reformed church do not allow of any work of ſupererogation.

SUPERFETATION, *ſuperfœtatio*, in medicine, a ſecond, or after conception, happening, when the mother, already pregnant, conceives of a later coition; ſo that ſhe bears at once two fœtuſes of unequal age and bulk, and is delivered of them at different times. We meet with inſtances of ſuperfetations in Hippocrates, Ariſtotle, Du Laurens, &c. But they are ſaid to be much more frequent in hares and ſows. Naturaliſts hold, that female rats are frequently born with young rats in their wombs; and we are told of extraordinary inſtances of this kind in the female part of the human ſpecies, by Bartholine, Mentzelius, and in the hiſtory of the Royal Academy of Sciences.

SUPERFICIAL CONTENT. See SUPERFICIES, AREA, and MEASURING.

SUPERFICIAL *fourneau*, in fortification, the ſame with caiſſon. See CAISSON.

SUPERFICIES, or SURFACE, in geometry, a magnitude conſidered as having two dimenſions; or extended in length and breadth, but without thickneſs or depth. In bodies, the ſuperficies is all that preſents itſelf to the eye. A ſuperficies is chiefly conſidered as the external part of a ſolid. When we ſpeak of a ſurface ſimply, and without any regard to body, we uſually call it figure. The ſeveral kinds of ſuperficies are as follow. Rectilinear ſuperficies, that comprehended between right lines; curvilinear ſuperficies, that comprehended between curve lines; plane ſuperficies, is that which has no inequality, but lies evenly between its boundary lines; convex ſuperficies, is the exterior part of a ſpherical, or ſpheroidical body; and a concave ſuperficies, is the internal part of an orbicular or ſpheroidical body.

The meaſure or quantity of a ſuperficies, or ſurface, is called the area thereof. See AREA and MEASURE.

The finding of this meaſure, or area, is called the quadrature thereof. See the article QUADRATURE.

To meaſure the ſurfaces of the ſeveral kinds of bodies, as ſpheres, cubes, paralellepipeds, pyramids, priſms, cones, &c. See the article SPHERE, &c.

*Line of* SUPERFICIES, a line uſually found on the ſector, and Gunter's ſcale, the deſcription and uſe whereof, ſee under SECTOR and GUNTER'S SCALE.

SUPERFINE, in the manufactories, a term uſed to expreſs the ſuperlative fineneſs of a ſtuff; thus a cloth, a camblet, &c. are ſaid to be ſuperfine, when made of the fineſt wool, &c. or when they are the fineſt that can be made. The term is particularly uſed among gold or ſilver wire drawers, for the gold or ſilver wire, which after being drawn through an infinite number of holes, each leſs and leſs, is at length brought to be no bigger than an hair.

SUPERINSTITUTION, *ſuperinſtitutio*, denotes an inſtitution upon another, as where A B is admitted and inſtituted to a benefice upon one title, and C D is admitted and inſtituted on that of another.

SUPERINTENDANT, in the french cuſtoms, an officer who has the prime management and direction of the finances or revenues of the king. The term is alſo uſed for the firſt officer of the queen's houſhold, who has the chief adminiſtration thereof. They have alſo a ſuperintendant of the buildings, anſwering to the ſurveyor of the works among us. See the article SURVEYOR.

SUPERINTENDANT alſo denotes an eccleſiaſtical ſuperior in ſeveral reformed churches, where epiſcopacy is not admitted, particularly among the Lutherans in Germany, and the Calviniſts in ſome other places. The ſuperintendant is in effect little other than a biſhop, only his power is ſomewhat more reſtrained than that of the dioceſan biſhops. He is

is the chief paſtor, and has the direction of all the inferior paſtors within his diſtrict or dioceſe.

SUPERIOR, or SUPERIOUR, ſomething raiſed above another, or that has a right to command another.

SUPERJURARE, was antiently a term uſed in our law where a criminal endeavoured to excuſe himſelf by his own oath, or by the oath of one or two witneſſes; and the crime charged againſt him was ſo notorious, that he was convicted upon the oaths of many more witneſſes; this was termed ſuperjurare.

SUPERLATIVE, in grammar, one of the three degrees of compariſon, being that inflection of nouns-adjective that ſerves to augment and heighten their ſignification, and ſhews the quality of the thing denoted to be in the higheſt degree. See the articles COMPARATIVE, POSITIVE, and COMPARISON.

In engliſh, the ſuperlative is uſually formed by the addition of *eſt* to the poſitive, as *richeſt*, *greateſt*, *&c.* and frequently by prefixing of *moſt*, as *moſt rich*, *moſt great*, *&c.*

SUPERNUMERARY, ſomething over and above a fixed number. In ſeveral of the offices are ſupernumerary clerks, to be ready on extraordinary occaſions. There are alſo ſupernumerary ſurveyors of the exciſe, to be ready to ſupply vacancies when they fall; theſe have but half-pay. In muſic, the ſupernumerary, called by the Greeks proſlambanomenos, is the loweſt of the chords of their ſyſtem, anſwering to *a*, *mi*, *la*, of the loweſt octave of the moderns. See the article DIAGRAM.

SUPERONERATIONE PASTURÆ, in law, a judicial writ which lies againſt a perſon that is impleaded in the county-court, for ſurcharging of a common with his cattle, in a caſe where he was formerly impleaded for it in the ſame court, and the cauſe is removed into one of the courts at Weſtminſter.

SUPERPARTICULAR, } See RATIO.
SUPERPARTIENS, }

SUPER-PRÆROGATIVA REGIS, in law, a writ that formerly lay againſt the king's widow, for marrying without a licence.

SUPER-PURGATION, *hypercathraſis*, in medicine, an exceſſive over-violent purging, the uſual effects of colliquating, corroſive and ſtimulating medicines. In the beginning of this diſorder, a very thin matter is evacuated; but afterwards, when the relaxation and aperture of the veſſels are increaſed, the neceſſary humours are diſcharged; there is firſt an excretion of yellow bile, then of phlegm, then of black bile, and laſt of all blood. See the article FLUX.

Thoſe who labour under a ſuperpurgation, muſt be treated with frictions of the ſkin, and a warm bath, drinking before they bathe thin, red, or yellow wine, for ſuch is eaſieſt of diſtribution, with ſops of bread, and pomegranates. If the evacuation continues, let the limbs be bound in ſuch a manner, that the bandage may be carried from the upper to the lower parts. Exhibit alſo a ſmall quantity of theriaca, to be taken with the fleſh of vipers, or for want of that, troches of theriaca, or troches of ſeeds, and of the antidote called philonium. Cupping-glaſſes may alſo be applied to the ſtomach, and cataplaſms of polenta and mulſum; after which, you may uſe aſtringent epithems, but the greateſt relief is had from frictions of the whole body, and potable remedies. The patient ſhould keep himſelf from cold air, or what is very warm. If the evacuation ſtill continues, the aforeſaid cataplaſms ſhould be applied, and obtundents injected in clyſters, ſuch as the fat of gooſe, ſweet wine, oil of ſpike, and the like.

SUPERQUADRIPARTIENS. See the article RATIO.

SUPERSCAPULARIS INFERIOR, in anatomy, the ſame with infraſpinatus. See the article INFRASPINATUS.

SUPERSCAPULARIS SUPERIOR, is the ſame with ſupraſpinatus. See the article SUPRASPINATUS.

SUPERSEDEAS, in law, according to Fitzherbert, is a writ which lies in divers caſes, and in general ſignifies a command to ſtay ſome of the ordinary proceedings in law, which, on good cauſe ſhewn, ought not to proceed. It is likewiſe uſed for ſtaying of an execution after a writ of error is allowed, and bail put in, but not before bail is given, in caſe there be a judgment upon verdict, or by default in debt, *&c.* A ſuperſedeas is alſo granted by the court for ſetting aſide an erroneous judicial proceſs, *&c.* And a priſoner may be thereby diſcharged upon entering his appearance, and on the plaintiff's not filing a declaration againſt him. For this writ is as good a cauſe to diſcharge the perſon, as the firſt proceſs is to arreſt him. There is a further writ of ſuperſedeas,

sedeas, where an audita querela is sued, and in cases of surety of the peace, when one is already bound to the peace in chancery, or elsewhere.

SUPER-STATUTO DE ARTICULIS CLERI, in law, a writ that lies against the sheriff, or other officer that distrains in the king's highway, or in the lands antiently given to the church.

SUPER-STATUTO FACTO POUR SENESCHAL ET MARSHAL DE ROY, *&c.* a writ which lies against the steward or marshal, for holding plea of freehold in his court, or for trespass, or contracts not made within the king's houshold.

SUPER-STATUTO VERSUS SERVANTES ET LABORATORES, a writ lying against a person who keeps another person's servant departed from his service, contrary to law.

SUPERSTITION, extravagant devotion, or religion, wrong directed, or conducted.

SUPERVISOR, a surveyor, or overseer. See the article SURVEYOR, *&c.*

It was formerly, and still remains a custom among some persons, to appoint a supervisor of a will, to see that the executors thereof do punctually observe and perform the same.

Supervisor formerly was used for surveyor of the highways. There are likewise certain officers of the excise, who are called supervisors, on account of their having the supervising and inspecting of the books, *&c.* of the inferior officers belonging to that branch of the revenue, to prevent their neglect of duty.

SUPINATION, in anatomy, the action of a supinator-muscle, or the motion whereby it turns the hand so as that the palm is lifted up towards heaven. See the next article.

SUPINATOR, in anatomy, a denomination given to two muscles of the arm, the one called the supinator longus, the other the supinator brevis, both serving to turn the palm of the hand upwards. The first has its origin from the exterior spine of the humerus, and its termination at the lower end of the radius; the second rises from the upper part of the ulna, and is inserted into the upper part of the radius, which it totally surrounds and incloses. This last muscle may also be of use in the bending of the cubit.

SUPINE, in latin grammar, part of the conjugation of a verb, being a verbal substantive of the singular number, and the fourth declension.

There are two kinds of supines; one, called the first supine, ending in *um*, of the accusative case, is always of an active signification, and marks a motion, as *abiit deambulatum*; the other, called the last supine, and ending in *u*, of the ablative case, is of a passive signification, and is governed by substantives or adjectives, as, *facile dictu*, &c.

SUPPLE, to supple a horse in the manege, is to make him bend his neck, shoulders, and sides, and to render all the parts of his body more pliable.

SUPPLEMENT *of an arch*, in geometry, or trigonometry, is the number of degrees that it wants of being an entire semicircle; as a complement, signifies what an arch wants of being a quadrant. See the article COMPLEMENT.

SUPPLEMENT, in matters of literature, an appendage to a book, to supply what is wanting therein.

SUPPLICAVIT, in law, a writ that issues out of the court of chancery for taking surety of the peace, where a person is in danger of receiving some bodily hurt from another. It is directed to the justices of the peace and sheriff of the county, and is grounded on the statute 1. of Edward III. which appoints, that certain persons shall be appointed by the lord-chancellor to take care of the peace. In order to sue out this writ, the party requiring it first goes before one of the masters in chancery and makes oath, that he does not desire the same out of any malice, but purely for his own safety, and the security of his person; upon which the master will make out a warrant, ordering the writ to be made out by one of the clerks of the six clerks office, after which the writ must be delivered to the sheriff to have his warrant thereon for arresting the party, *&c.*

SUPPORTED, in heraldry, a term applied to the uppermost quarters of a shield when divided into several quarters, these seeming as it were supported or sustained by those below. The chief is said to be supported when it is of two colours, and the upper colour takes up two thirds of it. In this case it is supported by the colour underneath.

SUPPORTERS, in heraldry, figures in an atchievement placed by the side of the shield, and seeming to support or hold up the same. Supporters are chiefly figures of beasts: figures of human creatures, for the like purpose, are properly called tenants. Some make another dif-

ference

ference between tenant and fupporter: when the fhield is borne by a fingle animal, it is called tenant; when by two, they are called fupporters. The figures of things inanimate fometimes placed afide of efcutcheons, but not touching or feeming to bear them, though fometimes called fupporters, are more properly cotifes. See the articles TENANT and COTICE.

The fupporters of the britifh arms are a lion and an unicorn: thofe of the french arms are angels, *&c.* See ARMS.

In England, none under the degree of a banneret are allowed fupporters, which are reftrained to thofe called the high nobility. The Germans permit none but princes and noblemen of rank to bear them: but among the French the ufe of them is more promifcuous.

SUPPOSITION, in mufic, the ufing two fucceffive notes of equal value as to time, one of which, being a difcord, fuppofes the other a concord. See HARMONY.

The harmony, Mr. Malcolm obferves, is to be always full on the accented part of the meafure or bar, and void of difcords; yet here difcords, by proper refolution and preparation, are even neceffary on the unaccented part of the meafure. Difcords, by conjoint degrees, may pafs without much offence, and it is not there required that the harmony be fo complete as on the accented part. This tranfient ufe of difcords, followed by concords, makes what the French call fuppofition. There are feveral kinds of fuppofition. The firft is when the principal parts proceed gradually from concord to difcord, and from difcord to concord; the intervening difcord ferving only as a tranfition to the following concord. Another kind is when the parts do not proceed gradually from the difcord to the concord, but defcend to it by the interval of a third. A third kind, like the fecond, is when the rifing to the difcord is gradual, but the defcending from it to the following concord, is by the diftance of a fourth. A fourth kind, very different from all the reft, is when the difcords fall on the accented part of the meafure, and the rifing to it is by the interval of a fourth: in which cafe it is abfolutely neceffary to follow it immediately by a gradual defcent into a concord that has juft been heard before the harmony to make the preceding difcord pafs without offence, and only feem a tranfition to the concord.

SUPPOSITORY, *fuppofitorium*, in pharmacy, a kind of medicated cone, or ball, which is introduced to the anus for opening the belly. Suppofitories are ufually made of foap, fugar, alum, or a piece of tallow-candle, about the length of a man's thumb and the breadth of a finger, though they may be made fmaller for children, and fometimes a little thicker for adults. Suppofitories are fometimes compounded of ingredients adapted to the difeafe and circumftances of the patient, as of honey, falt, powder of aloes, colocynthia, and the like. If one fuppofitory does not occafion a ftool, it muft be followed by another ftronger one; and if that does not fucceed, the repetition muft be continued till the effect required is produced. They are fometimes lubricated with oil or butter, that they may be introduced with greater eafe. Some ufe a lozenge of fugar, or a piece of thin linen cloth rolled up with a little lard or falt-butter, which greatly loofens the belly. For ulcers of the rectum, the beft fuppofitories are made of honey of rofes, powder of maftich and myrrh, or of colophony. The ftronger fuppofitories, which are compofed of acrid and ftimulating ingredients, are advantageoufly ufed in promoting a difficult birth, if the infant be in a natural pofition; and alfo for expelling the fecundines when they are tenacioufly retained in the uterus. In exhibiting them the patient fhould be put in the fame pofture as in giving a clyfter, and the fuppofitory muft be gently thruft up the anus with the finger.

SUPPRESSION, in law, the extinction or annihilating of an office, right, rent, or the like.

SUPPRESSION, in grammar and rhetoric, denotes an omiffion of certain words in a fentence, which yet are neceffary to full and perfect conftruction: as, "I come from my father's;" that is, "from my father's houfe."

Suppreffion is a figure of fpeech very frequent in our language, chiefly ufed for brevity and elegance. Some rules relating thereto are as follow: 1. Whenever a word comes to be repeated in a fentence oftener than once, it is to be fuppreffed. Thus we fay, "This is my mafter's horfe," not "This horfe is my mafter's horfe." 2. Words that are neceffarily fupplied may be fuppreffed: and 3. All words that ufe and cuftom fup-

preſs

press in other languages, are also to be suppressed in English, unless there be particular reasons for the contrary.

Suppression is also a figure in speech whereby a person in rage, or other disturbance of mind, speaks not out all he means, but suddenly breaks off his discourse. Thus the gentleman in Terence, extremely incensed against his adversary, accosts him with this abrupt saying, "Thou of all." The excess of his indignation and rage choaked the passage of his voice, and would not suffer him to utter the rest. But in these cases, though the discourse is not complete, the meaning is readily understood, and the evidence of the thought easily supplies the defect of words. Suppression sometimes proceeds from modesty and fear of uttering any word of ill and offensive sound.

SUPPRESSION, in medicine, is generally used for a retention of urine or the menses. See the article DYSURY, ISCHURY, MENSES, &c.

SUPPRESSIONIS IGNIS, a fire of suppression, a term used in chymistry to express such an application of fire to any subject that it shall at once act upon it, both above and below, in the same manner. The usual way of giving this heat is by covering the vessel in which the ingredients are put with sand, and then laying hot coals upon that, so that they may heat through the sand downwards.

SUPPURATION, in medicine and surgery, the second way wherein an inflammation terminates, being a conversion of the inspissated blood and the soft adjacent parts, as the vessels and fat into pus, or matter: which disorder, when it has not yet found an opening, is generally called an abscess. See INFLAMMATION, ABSCESS, PHLEGMON, TUMOUR, &c.

The best cure of an inflammation is by resolution or dispersion: but when this is out of the power of the surgeon or physician to effect, and when tumours and phlegmons shew a tendency to suppuration, all the resolving and dispersing medicines must be laid aside, and great care must be taken to forward the maturity of the inflammation; that is, to convert the stagnated blood into laudable matter; then to give a discharge or vent to this suppurated matter; afterwards to cleanse the part; and finally to incarn and heal it. See the articles DISPERSION, ULCER, WOUND, &c.

In general, suppuration is to be promoted by such of the emollient medicines as obstruct the pores of the skin, as fats, oils, and glutinous medicines; as also the sharp, pungent, and in some degree caustic medicines, which may be used in form of cataplasms or plasters. But to be more particular, suppurating medicines, besides those already enumerated under abscess, &c. are the fats of a goose, of a dog, of a man, of a viper, and of a bear; pigeon and cow-dung; bran, yeast, herrings, leeches, melilot, tobacco, oil, burgundy pitch, common-pitch, rosin, deer-suet, ox-suet, sheep-suet, and frankincense. These medicines, either alone or compounded, are to be applied hot to the part, and the application frequently repeated, till the matter within is found to be sufficiently ripened by the softness and whiteness of the tumour: but when the abscess is small, it is sufficient and more convenient to apply some of the ripening plasters, as diachylon, with the gums, or the like, till the suppuration is perfected.

A ripening cataplasm from the London dispensatory, is as follows: Take of figs, four ounces; yellow basilicum ointment, one ounce; galbanum strained, half an ounce: beat the figs thoroughly in a mortar, occasionally dropping in some spirit of wine, or strong ale; then carefully mix them with the ointment first liquified along with the galbanum. And a ripening plaster from the Edinburgh dispensatory is this, Take of gum-plaster, an ounce and a half; burgundy-pitch, half an ounce: boil them together.

In general, it is to be observed, that suppurative medicines are such as by the activity and warmth of their parts are able to penetrate the pores, and mix with and rarify any obstructed matter, so that it may be rendered fit to discharge, upon laying open the part by a caustic or incision. Now, in many instances, as the matter by this means rarifies and grows more fluid, the refluent blood is apt to wash it back into the common mass, which sometimes is of that nature as to do a great deal of mischief; or by making it take up more room upon its rarefaction, occasions it more to distend the parts in which it is contained, whereon a sense of pain is excited, and thereby a greater concourse of fluid, and consequently a needless increase of the tumour; so that medicines under this denomination require to be in the hand of such as are so well acquainted with the mechanism of the animal œconomy as to be able to apply them to the best advantage,

advantage, and know how to avoid the hazards which may arife from their abufe. Nor are internal remedies to be neglected in order to further a fuppuration, efpecially when the tumours are large and of confequence. In thefe cafes, when the blood moves too flowly, which may be known by the pulfe, the patient muft be allowed to eat meat, and muft take fuch medicines as are warm and ftimulating, by means of which, and by the increafed motion of the blood, the infpiffated particles contained in the fmaller veffels will be the more eafily converted into matter. Strong broths are very proper for this purpofe, as alfo the ufe of wine, or ale, in moderation; and venice-treacle, diafcordium, and the confection of alkermes, are to be the medicines taken three or four times a day, and medicated teas made of faunders-wood, faffafrafs, or cinnamon. But on the contrary, when the motion of the blood is too violent, and the heat too great, cooling medicines are to be given, fuch as the thin and watery drinks, the fub-acid medicines, and nitre: bleeding in a fmall quantity is alfo often neceffary in this cafe. But when the conftitution is found, and the blood's motion regular, the ufe of internal medicines to promote fuppuration is trifling, and may be altogether rejected.

SUPPURATIVES, or SUPPURATING MEDICINES, fuch as promote fuppuration. See the preceding article.

SUPPURATION. See COMPUTATION.

SUPRACOSTALES, or LEVATORES COSTARUM, in anatomy, mufcles ferving to refpiration; being among thofe that dilate the thorax for that end, and therefore reckoned among the dilatatores. See the article DILATATORES.

Thefe mufcles are of two kinds, being diftinguifhed from their figures into fhort and long. The fhort ones are twelve on each fide; they have their origin from the tranfverfe proceffes of eleven vertebræ of the back, and of one that is in the lower one of the neck, and they are inferted into the hinder part of the ribs. The long fupracoftales are three or four: their origin is the fame from the feventh, eighth, ninth, and tenth vertebræ, and their end in the ninth, tenth, eleventh, and twelfth ribs.

SUPRALAPSARY, in theology, a perfon who holds that God, without any regard to the good or evil works of men, has refolved, by an eternal decree, to fave fome and damn others. Thefe are alfo called antelapfaries, and are oppofed to fublapfaries and infralapfaries.

SUPRASPINATUS, in anatomy, a mufcle thus called from its flefhy origination at the upper end of the bafis of the fcapula above the fpine, to the upper part whereof it is connected, as alfo to the fuperior edge of the fcapula, whence marching along the upper interfcapulum, or thin part of the fcapula, which it fills, it paffes under the acromium and articulation of the humerus. It helps to lift the arm upwards.

SUPREMACY, in our polity, the fuperiority or fovereignty of the king over the church as well as ftate, whereof he is eftablifhed head. See the article KING. The king's fupremacy was at firft eftablifhed, or, as others fay, recovered, by king Henry VIII. in 1534, after breaking with the pope. It is fince confirmed by feveral canons, as well as by the articles of the church, and is paffed into an oath which is required as a neceffary qualification for all offices and employments both in church and ftate, from perfons to be ordained, from the members of both houfes of parliament, *&c.*

SURA, in anatomy, the calf, or flefhy part of the leg. The word is alfo ufed by fome for the fibula. See FIBULA.

SURAT, a city and port-town of hither India, in the province of Guzurat, or Cambaya, fituated on the river Tapte, ten miles eaft of the Indian-fea: in eaft long. 72° 20′, north lat. 21° 30′.

SURBATING, among farriers, is when the fole of a horfe's foot is worn, bruifed, or fpoiled by beating the hoof againft the ground in travelling without fhoes, or going in hot fandy lands, or with a fhoe that hurts the fole, lies too flat to it, or the like. Sometimes alfo it happens by over-riding a horfe while young, before his feet are hardened; and fometimes by the hardnefs of the ground and high lifting his feet. The figns hereof are his halting on both fore-legs, and going ftiffly, and creeping as if half foundered. In the general, there is nothing better for furbated feet than tar melted into the foot, or vinegar boiled with foot to the confiftence of a broth, and put into the foot boiling hot, with hurds over it, and fplints to keep it in.

SURCHARGE, the fame with overcharge, and whatever is above that which is juft and right. Surcharge of the foreft or a common, is when a commoner puts more

beafts

beaſts in the foreſt or common than he has a right to do.

SURCINGLE, a girdle wherewith the clergy of the church of England uſually tie their caſſock. See GIRDLE.

SURCOAT, a coat of arms to be worn over the body armour. See the article COAT *of arms*.

The ſurcoat is properly a looſe thin taffaty-coat, with arms embroidered or painted on it, ſuch as is worn by heralds: antiently alſo uſed by military men over their armour, to diſtinguiſh themſelves by.

SURCULUS, in the anatomy of plants, a word uſed to expreſs that part of the branching of the ribs of a leaf, which is of a middle kind betwixt the great middle rib and the ſmalleſt reticular ramifications. The middle rib is by the writers on theſe ſubjects called petiolum. The firſt diviſion that go off laterally from theſe are called rami, or branches; the next diviſion of theſe into more minute ones, ſurculi; and the final divarications of theſe into the reticular work that ſpreads itſelf over the whole leaf, capillamenta. See the article PETIOLUM, *&c.*

SURD, in arithmetic and algebra, denotes any number or quantity that is incommenſurable to unity: otherwiſe called an irrational number or quantity.

The ſquare roots of all numbers, except 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, *&c.* (which are the ſquares of the integer numbers, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, *&c.*) are incommenſurables: and after the ſame manner the cube roots of all numbers but of the cubes of 1, 2, 3, 4, 5, 6, *&c.* are incommenſurables: and quantities that are to one another in the proportion of ſuch numbers, muſt alſo have their ſquare-roots, or cube roots, incommenſurable.

The roots, therefore, of ſuch numbers, being incommenſurable, are expreſſed by placing the proper radical ſign over them: thus $\sqrt[2]{2}$, $\sqrt[2]{3}$, $\sqrt[2]{5}$, $\sqrt[2]{6}$, *&c.* expreſs numbers incommenſurable with unity. However, though theſe numbers are incommenſurable themſelves with unity, yet they are commenſurable in power with it; becauſe their powers are integers, that is, multiples of unity. They may alſo be commenſurable ſometimes with one another, as the $\sqrt[2]{8}$ and $\sqrt[2]{2}$; becauſe they are to one another as 2 to 1: and when they have a common meaſure, as $\sqrt[2]{2}$ is the common meaſure of both; then their ratio is reduced to an expreſſion in the leaſt terms, as that of commenſurable quantities, by dividing them by their greateſt common meaſure. This common meaſure is found as in commenſurable quantities, only the root of the common meaſure is to be made their common diviſor: thus $\frac{\sqrt{12}}{\sqrt{3}} = \sqrt{4} = 2$, and $\frac{\sqrt{18a}}{\sqrt{2}} = 3\sqrt{a}$.

A rational quantity may be reduced to the form of any given ſurd, by raiſing the quantity to the power that is denominated by the name of the ſurd, and then ſetting the radical ſign over it: thus $a = \sqrt[2]{a^2} = \sqrt[3]{a^3} = \sqrt[4]{a^4} = \sqrt[5]{a^5} = \sqrt[n]{a^n}$, and $4 = \sqrt{16} = \sqrt[3]{64} = \sqrt[4]{256} = \sqrt[5]{1024} = \sqrt[n]{4^n}$.

As ſurds may be conſidered as powers with fractional exponents, they are reduced to others of the ſame value that ſhall have the ſame radical ſign, by reducing theſe fractional exponents to fractions having the ſame value and a common denominator. Thus $\sqrt[n]{a} = a^{\frac{1}{n}}$, and $\sqrt[m]{a} = a^{\frac{1}{m}}$, and $\frac{1}{n} = \frac{m}{nm}$, $\frac{1}{m} = \frac{n}{nm}$, and therefore $\sqrt[n]{a}$ and $\sqrt[m]{a}$, reduced to the ſame radical ſign, become $\sqrt[nm]{a^m}$ and $\sqrt[nm]{an}$. If you are to reduce $\sqrt[2]{3}$ and $\sqrt[3]{2}$ to the ſame denominator, conſider $\sqrt[2]{3}$ as equal to $3^{\frac{1}{2}}$, and $\sqrt[3]{2}$ as equal to $2^{\frac{1}{3}}$, whoſe indices reduced to a common denominator, you have $3^{\frac{1}{2}} = 3^{\frac{3}{6}}$, and $2^{\frac{1}{3}} = 2^{\frac{2}{6}}$, and conſequently, $\sqrt[2]{3} = \sqrt[6]{3^3} = \sqrt[6]{27}$, and $\sqrt[3]{2} = \sqrt[6]{2^2} = \sqrt[6]{4}$; ſo that the propoſed ſurds $\sqrt[2]{3}$ and $\sqrt[3]{2}$, are reduced to other equal ſurds $\sqrt[6]{27}$ and $\sqrt[6]{4}$, having a common radical ſign.

Surds of the ſame rational quantity are multiplied by adding their exponents, and divided by ſubtracting them; thus, $\sqrt[2]{a} \times \sqrt[3]{a} = a^{\frac{1}{2}} \times a^{\frac{1}{3}} = a^{\frac{3+2}{6}} = a^{\frac{5}{6}} = \sqrt[6]{a^5}$; and $\frac{\sqrt[3]{a}}{\sqrt[5]{a}} = \frac{a^{\frac{1}{3}}}{a^{\frac{1}{5}}} = a^{\frac{1}{3} - \frac{1}{5}} = a$

$\frac{5-3}{15} = a^{\frac{2}{15}} = \sqrt[15]{a^2}$; $\sqrt[m]{a} \times \sqrt[n]{a} = a^{\frac{m+n}{mn}}$; $\frac{\sqrt[m]{a}}{\sqrt[n]{a}} = a^{\frac{n-m}{mn}}$; $\sqrt[2]{2} \times \sqrt[3]{2} = \sqrt[6]{2^5} = \sqrt[6]{32}$; $\frac{\sqrt[2]{2}}{\sqrt[3]{2}} = \sqrt[6]{2}$.

If the ſurds are of different rational quantities, as $\sqrt[n]{a^2}$ and $\sqrt[n]{b^3}$, and have the ſame ſign, multiply theſe rational quantities into one another, or divide them by one another, and ſet the common radical ſign over their product or quotient. Thus, $\sqrt[n]{a^2} \times \sqrt[n]{b^3} = \sqrt[n]{a^2 b^3}$; $\sqrt[2]{2} \times \sqrt[2]{5} = \sqrt[2]{10}$; $\frac{\sqrt[m]{a^4}}{\sqrt[m]{b^3 a}} = \sqrt[m]{\frac{a^4}{b^3 a}} = \sqrt[m]{\frac{a^3}{b^3}}$; $\frac{\sqrt[3]{9}}{\sqrt[3]{24}} = \sqrt[3]{\frac{9}{24}} = \sqrt[3]{\frac{3}{8}} = \frac{1}{2} \sqrt[2]{3}$.

If ſurds have not the ſame radical ſign, reduce them to ſuch as ſhall have the ſame radical ſign, and proceed as before; $\sqrt[m]{a} \times \sqrt[n]{b} = \sqrt[nm]{a^n b^m}$; $\frac{\sqrt[m]{a}}{\sqrt[n]{x}} = \sqrt[mn]{\frac{a^n}{x^m}}$; $\sqrt[2]{2} \times \sqrt[3]{4} = 2^{\frac{1}{2}} \times 4^{\frac{1}{3}} = 2^{\frac{3}{6}} \times 4^{\frac{2}{6}} = \sqrt[6]{2^3 \times 4^2} = \sqrt[6]{8 \times 16} = \sqrt[6]{128}$; $\frac{\sqrt[3]{4}}{\sqrt[2]{2}} = \frac{4^{\frac{1}{3}}}{2^{\frac{1}{2}}} = \frac{4^{\frac{2}{6}}}{2^{\frac{3}{6}}} = \sqrt[6]{\frac{4^2}{2^3}} = \sqrt[6]{\frac{16}{8}} = \sqrt[6]{2}$. If the ſurds have any rational coefficients, their product or quotient muſt be prefixed; thus, $2\sqrt[2]{3} \times 5\sqrt[2]{6} = 10\sqrt[2]{18}$. The powers of ſurds are found as the powers of their quantities, by multiplying their exponents by the index of the power required; thus the ſquare of $\sqrt[3]{2}$ is $2^{\frac{1}{3} \times 2} = 2^{\frac{2}{3}} = \sqrt[3]{4}$; the cube of $\sqrt[2]{5} = 5^{\frac{1}{2} \times 3} = 5^{\frac{3}{2}} = \sqrt[2]{125}$. Or you need only, in involving ſurds, raiſe the quantity under the radical ſign to the power required, continuing the ſame radical ſign; unleſs the index of that power is equal to the name of the ſurd, or a multiple of it, and in that caſe the power of the ſurd becomes rational. Evolution is performed by dividing the fraction, which is the exponent of the ſurd, by the name of the root required. Thus the ſquare root of $\sqrt[3]{a^4}$ is $\sqrt[3]{a^2}$ or $\sqrt[6]{a^4}$.

The ſurd $\sqrt[m]{a^m x} = a\sqrt[m]{x}$; and, in like manner, if a power of any quantity of the ſame name with the ſurd divides the quantity under the radical ſign without a remainder, as here $a^m$ divides $a^m x$, and 25 the ſquare of 5, divides 75 the quantity under the ſign in $\sqrt[2]{75}$ without a remainder; then place the root of that power rationally before the ſign, and the quotient under the ſign, and thus the ſurd will be reduced to a more ſimple expreſſion. Thus $\sqrt[2]{75} = 5\sqrt{3}$; $\sqrt[2]{48} = \sqrt[2]{3 \times 16} = 4\sqrt[2]{3}$; $\sqrt[3]{81} = \sqrt[3]{27 \times 3} = 3\sqrt[3]{3}$.

When ſurds are reduced to their leaſt expreſſions, if they have the ſame irrational part, they are added or ſubtracted, by adding or ſubtracting their rational coefficients, and prefixing the ſum or difference to the common irrational part. Thus, $\sqrt[2]{75} + \sqrt[2]{48} = 5\sqrt{3} + 4\sqrt{3} = 9\sqrt{3}$; $\sqrt[3]{81} + \sqrt[3]{24} = 3\sqrt[3]{3} + 2\sqrt[3]{3} = 5\sqrt[3]{3}$; $\sqrt[2]{150} - \sqrt[2]{54} = 5\sqrt{6} - 3\sqrt{6} = 2\sqrt{6}$; $\sqrt{a^2 x} + \sqrt{b^2 x} = a\sqrt{x} + b\sqrt{x} = \overline{a+b} \times \sqrt{x}$.

Compound ſurds are ſuch as conſiſt of two or more joined together; the ſimple ſurds are commenſurable in power, and by being multiplied into themſelves, give at length rational quantities; yet compound ſurds multiplied into themſelves, commonly give ſtill irrational products. But, when any compound ſurd is propoſed, there is another compound ſurd which, multiplied into it, gives a rational product. Thus if $\sqrt{a} + \sqrt{b}$ were propoſed, multiplying it by $\sqrt{a} - \sqrt{b}$, the product will be $a - b$.

The inveſtigation of that ſurd, which multiplied into the propoſed ſurd, gives a rational product, is made eaſy by three theorems, delivered by Mr. Maclaurin, in

in his Algebra, p. 109, ſeq. to which we refer the curious.

This operation is of uſe in reducing ſurd expreſſions to more ſimple forms. Thus ſuppoſe a binominal ſurd divided by another, as $\sqrt[2]{20}+\sqrt[2]{12}$, by $\sqrt[2]{5}-\sqrt[2]{3}$, the quotient might be expreſſed by $\frac{\sqrt{20}+\sqrt{12}}{\sqrt{5}-\sqrt{3}}$. But this might be expreſſed in a more ſimple form, by multiplying both numerator and denominator, by that ſurd, which multiplied into the denominator, gives a rational product: thus,

$$\frac{\sqrt{20}+\sqrt{12}}{\sqrt{5}-\sqrt{3}}=\frac{\sqrt{20}+\sqrt{12}}{\sqrt{5}-\sqrt{3}}\times\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}}=\frac{\sqrt{100}+2\sqrt{60}+6}{5-3}=\frac{16+2\sqrt{60}}{2}=8+$$

$2\sqrt{15}$. To do this generally, ſee Maclaurin, lib. cit. p. 113.

When the ſquare root of a ſurd is required, it may be found, nearly, by extracting the root of a rational quantity that approximates to its value. Thus to find the ſquare root of $3+2\sqrt{2}$, firſt calculate $\sqrt{2}=1,41421$. Hence $3+2\sqrt{2}=5,82842$, the root of which is found to be nearly 2,41421.

In like manner we may proceed with any other propoſed root. And if the index of the root, propoſed to be extracted, be great, a table of logarithms may be uſed. Thus $\sqrt[7]{5+\sqrt[13]{17}}$ may be moſt conveniently found by logarithms.

Take the logarithms of 17, divide it by 13; find the number correſponding to the quotient; add this number to 5; find the logarithm of the ſum, and divide it by 7, and the number correſponding to this quotient will be nearly equal to $\sqrt[7]{5+\sqrt[13]{17}}$.

But it is ſometimes requiſite to expreſs the roots of ſurds exactly by other ſurds. Thus, in the firſt example, the ſquare root of $3+2\sqrt{2}$ is $1+\sqrt{2}$: for $\overline{1+\sqrt{2}}\times\overline{1+\sqrt{2}}=1+2\sqrt{2}+2=3+2\sqrt{2}$. For the method of performing this, the curious may conſult Mr. Maclaurin's Algebra, p. 115, ſeq. where alſo rules for trinomials, &c. may be found.

SURDESOLID, or SURSOLID. See the article SURSOLID.

SURETY, in law, generally ſignifies the ſame with bail. See the article BAIL.

There is alſo a ſurety of the peace, whereby a perſon, in danger of hurt from another, is ſecured by a bond or recognizance of the offending party, and his ſureties entered into to the king, and taken by a competent judge of record, &c.

SURFACE, or SUPERFICIES. See the article SUPERFICIES.

SURFEIT, in medicine, a ſickneſs proceeding from the ſenſation of a load at the ſtomach, uſually attended with eruptions, and ſometimes with a fever.

Surfeits may be cauſed, ſays Dr. Shaw, 1. By voracity; from whence the ſtomach and inteſtines are overcharged, digeſtion weakened, and the chyle rendered crude or viſcid, and the blood corrupted. If what was thus devoured were high ſeaſoned or inflammatory, or happened to lie long in the body, it is ſuppoſed to cauſe a fever alſo. 2. By drinking of ſmall liquors in hot weather, or when the body is heated by exerciſe; which, perhaps, chills the fluids, and gives a check to perſpiration; from whence alſo may ariſe a fever and eruptions. Summer fruits likewiſe, as cucumbers, apples, cherries, &c. may have the ſame effect. 3. By too great exerciſe or heat, whence the fluids are rarified and thrown into too rapid a circulation, which being ſuddenly ſtopped, as may happen by cooling too faſt, there enſues alſo a ſtoppage of perſpiration. 4. By the ſtate or ſome change of the air; as by blaſts, or vehemently hot and ſultry weather, or cold winds giving a ſudden check to, and preventing, perſpiration. See PERSPIRATION.

Eruptions may not appear in ſurfeits, either by reaſon of the ſlightneſs of the cauſe, or ſome wrong management at the firſt. Nauſea's, oppreſſion, ſickneſs, and ſometimes a vomiting and a fever, but ſeldom eruptions, attend on an overloaded ſtomach. This ſpecies of a ſurfeit is called crapula; ſickneſs, gnawing at the ſtomach, ſometimes eruptions and a fever attend ſurfeits, from the bad quality of any thing uſed as food. The fever always decreaſes as the irruptions increaſe; and if theſe ſuddenly diſappear, the fever increaſes. Thoſe ſurfeits, which proceed from too great exerciſe, or too ſudden cooling after it, appear with ſickneſs, a fever and eruptions, though the two laſt ſymptoms may be wanting. Thoſe cauſed from ſome alteration in the air, and vulgarly called blaſts, appear with redneſs of the face, ſpots, and a fever, often with bliſters on the ſkin. See FEVER.

SURGE, in the ſea-language, the ſame with a wave. See the article WAVE.

Alfo when heaving at the capftan, if the cable royal, or meffenger flip a little, they call it furging.

SURGERY, or CHIRURGERY, χειρουργικη, the art of curing all manner of wounds, and other diforders, where the application of the hand, affifted by proper inftruments, is neceffary.

Surgery, or manual operation, is highly beneficial to mankind, fince by means hereof many grievous diforders are relieved, as wounds, fractures, luxations, ulcers, &c. where diet and medicine would afford very little, and fometimes no help at all. See the articles WOUND, FRACTURE, &c.

Surgery, fays Celfus, is that branch of phyfic which informs us how to cure or prevent diforders, by the affiftance of our hands or inftruments, or by the application of external remedies: thus diforders are often prevented by bleeding, fcarifying, iffues, fetons, &c. See PHLEBOTOMY, SCARIFICATION, &c.

A thorough knowledge in anatomy is abfolutely neceffary for a furgeon, otherwife his actions are always uncertain, and ever obnoxious to a multiplicity of dangers. He ought alfo to be expert in the art of managing his hands and inftruments dexteroufly in the performance of fuch operations as any cafe may require; as amputation, lithotomy, extirpation, cauterizing, &c. See the articles AMPUTATION, LITHOTOMY, &c.

In the days of Hippocrates, furgery was fo connected with medicine, that the former was fcarce diftinguifhed from the latter by any peculiar and difcriminating name; and that Hippocrates himfelf affifted the fick, by manual operation, is a fact which cannot be called in queftion. During thefe laft fifty years, furgery has been cultivated with very great fuccefs. M. le Dran has furnifhed us with inftructions which will inform the moft fkilful proficients. M. de la Faye, the ingenious commentator on Dionis, has likewife given us, in his notes, not only what his own experience and reflections have fuggefted, but alfo, as he fays, the opinions and obfervations of the greateft furgeons at Paris; and indeed the frequent mention he makes of Meff. Morand, Petit, de la Peyronie, and others, are fufficient proofs that his comments are an exact reprefentation of the prefent ftate of furgery in France. M. Garengeot's treatife on the operations of furgery, lies under the difadvantage of having been publifhed fome years fince, and before many of thofe improvements were made, which are now univerfally known: it, however, contains feveral cafes and remarks well worth the attention of a ftudious reader. Heifter's furgery is in every body's hands, and the character of Heifter is fo well eftablifhed, that any account of that work is needlefs. Nor need we mention the treatife of furgery, and critical enquiry, of the ingenious Mr. Sharp, fince the name of the author is abundantly fufficient. If the reader defires a more particular account of chirurgical authors, we refer him to the article OPERATION, to Heifter's Surgery, and to Dr. James's Medical Dict. under the article CHIRURGIA, where he will find a very large catalogue of them.

SURIANA, in botany, a genus of the pentandria-pentagynia clafs of plants, the corolla of which confifts of five petals, obverfely ovated, patent, and of the length of the cup: there is no pericarpium except the crufts of the feeds, which are five in number, and roundifh. It is a native of South America.

SURINAM, the capital of the dutch fettlements in Guiana, in South America: weft long. 56°, and north lat. 6° 30′.

SURMOUNTED, in heraldry, is when one figure is laid over another. As the pile furmounted of a chevron in plate CCLX. fig. 2.

SURNAME, or SIRNAME, a name added to the proper or baptifmal name, to denote the perfon of fuch a family.

SURREBUTTER, in law, a fecond rebutter, or the replication of the plaintiff to the defendant's rebutter.

SURREJOINDER, is a fecond defence of the plaintiff's declaration by way of anfwer to the defendant's rejoinder.

SURRENDER, in common law, an inftrument in writing, teftifying that the particular tenant of lands and tenements for life or years, doth fufficiently confent and agree, that he who has the next or immediate remainder or reverfion thereof, fhall have the prefent eftate of the fame in poffeffion, and that he thereby yields and gives up the fame to him.

A furrender may not be made of eftates in fee, nor of rights and titles only; neither can one termor regularly furrender to another. For it is ordained by ftatute, that no eftate of freehold, or term for years, fhall be granted or furrendered but by deed in writing, figned by the parties,

parties, or by operation at law, &c. See the article DEED.

Besides the usual surrender at common law, there is a customary surrender of copyhold lands, and likewise a surrender of letters-patent to the king, in order that he may grant the estate to whom he thinks meet.

SURREPTITIOUS, or SUBREPTITIOUS. See SUBREPTITIOUS.

SURRY, a county of England, bounded by the river Thames, which separates it from Middlesex, on the north; by Kent, on the east; by Sussex, on the south; and by Berkshire, on the west; being thirty-four miles long, and twenty-one broad.

SURROGATE, in law, denotes a person that is substituted, or appointed, in the room of another; and most commonly of a bishop, or of his chancellor.

SURSISE, in law, a name especially used for such penalties and forfeitures, as are imposed upon those persons that do not duly pay their duties or rent for castle-ward, in the castle of Dover.

SURSOLID, or SURDESOLID, in arithmetic and algebra, the fifth power, or fourth multiplication of any number or quantity considered as a root. See ROOT.

SURSOLID PROBLEM, in mathematics, is that which cannot be resolved but by curves of a higher nature than a conic section, *v. gr.* in order to describe a regular endecagon, or figure of eleven sides in a circle, it is required to describe an isosceles triangle on a right line given, whose angles at the base shall be quintuple to that at the vertex; which may easily be done by the intersection of a quadratrix, or any other curve of the second gender. See the articles CURVE and QUADRATRIX.

SURVEY, in law, is the ascertaining not only the boundaries and royalties of a manor, or estate in lands; but also the tenure of the respective tenants, and the rent and value of the same. In this last sense, it is taken for a court; because on the failing of an estate, consisting of manors, to a new lord, where there are tenants by lease, and copyholders, a court of survey is generally held; and sometimes upon other occasions, to apprise the lord of his right and interest.

SURVEYING, the art or act of measuring land; that is, of taking the dimensions of any tract of ground, laying down the same in a map or draught, and finding the content or area thereof.

Surveying, called also geodæsia, is a very antient art; it is even held to have been the first or primitive part of geometry, and that which gave occasion to, and laid the foundation of all the rest. See the article GEOMETRY.

Surveying consists of three parts or members; the first is the taking of the necessary measures, and making the necessary observations on the ground itself; the second, is the laying down of these measures and observations on paper: and the third, the finding the area or quantity of ground thus laid down.

The first is what we properly call surveying: the second we call plotting or protracting, or mapping: and the third casting up. The first, again, consists of two parts, *viz.* the making of observations for the angles, and the taking of measures for the distances. The former of these is performed by some one or other of the following instruments, *viz.* the theodolite, circumferentor, semicircle, plain table, or compass: the description and manner of using each whereof, see under its respective article. The latter is performed by means either of the chain or the perambulator: the description and manner of applying each whereof, see under its respective article.

It is useful in surveying to take the angles which the bounding lines form with the magnetic needle, in order to check the angles of the figure, and to plot them conveniently afterwards.

Large maps, representing considerable extents of ground, are subject to a good many inconveniencies, especially if carried into the fields, to be compared with them; such maps become very troublesome in the wind, and it is difficult to find out the part you want. To remedy this, a general and small map of the manor, or county, &c. should be first made on one sheet of paper, the several parts may be set off on other separate sheets, and the general map being divided into as many squares as there are of these particular sheets, the relation of the whole to the several parts is easily seen; and all these maps may then be bound up in a book.

The second branch of surveying is the plotting or laying down upon paper, the several sides and angles of the figure surveyed; the manner of doing which has already been explained under the article plotting. See the article PLOTTING.

However, it is proper to observe, that if the lands to be plotted are hilly, and not

in any one plane, the lines meaſured cannot be truly laid down on paper, without being reduced to one plane, which muſt be the horizontal, becauſe angles are taken in that plane.

In viewing objects, if they have much altitude or depreſſion, either write down the degree and decimal, ſhewn on the double ſextant, or the links, ſhewn on the back ſide, which laſt ſubſtracted from every chain in the ſtation-line, leaves the length in the horizontal plane; but if the degree is taken, the following table will ſhew the quantity.

A table of the links to be ſubſtracted out of every chain in hypothenuſal lines of ſeveral degrees, altitude, or depreſſion, for reducing them to horizontal.

| deg. | links. | deg. | links. | deg. | links. |
|---|---|---|---|---|---|
| 4.05 | $\frac{1}{4}$ | 14.07 | 3 | 23.074 | 8 |
| 5.73 | $\frac{1}{2}$ | 16.26 | 4 | 24.495 | 9 |
| 7.02 | $\frac{3}{4}$ | 18.195 | 5 | 25.84 | 10 |
| 8.11 | 1 | 19.95 | 6 | 27.13 | 11 |
| 11.48 | 2 | 21.565 | 7 | 28.36 | 12 |

Let the firſt ſtation-line really meaſure 1107 links, and the angle of altitude, or depreſſion, be 19° 95′; looking in the table, I find 19° 95′ is 6 links; now 6 times 11 is 66, which ſubtracted from 1107 leaves 1041, the true length to be laid down.

The third branch conſiſts in reducing the ſeveral diviſions, incloſures, *&c.* into triangles, ſquares, trapeziums, parallelograms, *&c.* but eſpecially triangles; and finding the areas or contents of theſe ſeveral figures. See the articles Area, Superficies, *&c.*

Surveying *a harbour.* This being an extremely uſeful, and, at the ſame time, difficult part of ſurveying; it will be proper to ſhew not only in what manner the obſervations ſhould be made, but how the plan or draught is to be plotted, or laid down on paper.

With reſpect to the obſervations, it will be requiſite, 1. To get as diſtinct an idea as poſſible of the place to be ſurveyed; for which purpoſe it will be neceſſary, before the work is begun, to walk ſeveral times along the coaſt, carefully obſerving the ſeveral particulars neceſſary to be taken notice of. 2. Having acquired an idea of the place, ſignals muſt be erected at every angle, *&c.* as at C, D, E, F, G, H, and I (pl. CCLXIV.) alſo at the ends of the ſands, *&c.* as at Q, S, T, V, W, X, Y, and Z. And when you are at the point Q, erecting the ſignal, obſerve what objects on the land are in a right-line, which are the windmill at *t* and the church at K, which objects muſt be inſerted in your map as a mark for ſhips to avoid the ſand QTW. Likewiſe, when you are in the midſt of the channel between the ends of the ſands W and X, obſerve what objects are in a direct line, which are the houſe at *w* and the church at O. In like manner, when you are at *y*, the two windmills at P and L will be in a right-line, as will the windmill at P and the church at K when you are at Z. Theſe objects you muſt be careful to inſert in your map; and, if there be none that will anſwer the intention, ſome ought to be erected. 3. The ſignals, *&c.* being erected, place your inſtrument at A, and obſerve the bearing of the ſignal at C; alſo the ſeveral angles comprehended between the lines AQ, AS, AT, AY, and AZ, and the line AC. And becauſe the object at X will be in a right-line with that at T, therefore the angle will be the ſame. 4. Meaſure along the line AC with your chain or perambulator, and, when you come to R, note down the diſtance from A to R; and, fixing your inſtrument in the ſame ſituation as at A, obſerve the angles intercepted between the lines RV and RW and the line RC. And becauſe the windmill at *t* is in a perpendicular direction to the line AC in the point R, meaſure the diſtance from thence to that windmill, noting it down alſo in your book. 5. Continue the meaſuring of the line AC from R towards C, obſerving, if the edge of the water is not parallel to the line AC, to meaſure the diſtance in a perpendicular direction, as the ſmall perpendiculars *a*, *b*, *c*, &c. but be ſure to remark the diſtance ſuch perpendiculars are from the point A, or firſt ſtation. Alſo, when you perceive that the windmill at P is in a perpendicular direction to the line AC, meaſure the diſtance *d* P. 6. When you have meaſured to B, fix your inſtrument there in the ſame poſition as at A, and obſerve the angles which the lines BY and BZ form with the line BC. Then turn the inſtrument about (the index being fixed at the beginning of the graduations) till through the ſights you ſee the object at A; and fix the inſtrument by the ſcrew in that poſition; then obſerve the angles comprehended between the line BA and the lines BX, BW, BV, BS, BT, and BQ.

# SURVEYING a Harbour.

Sand Hills

Town

all dry at low water

A Scale of Furlongs

1 2 3 4

J. Jefferys sculp.

BQ. Alfo turning about the brafs-limb of the inftrument (the index being fixed at the beginning of the graduations) till the two fights be in a right-line with the object at A; and, faftening the inftrument in this pofition, take the angles intercepted between the line BA and the lines BM, BL, and BK, and meafure the diftance BM. 7. Having meafured the whole line AC, fix your inftrument at C in the fame pofition as before, and take the angles BCD, and DCE, meafuring the diftance CD and the perpendicular *f*. 8. Remove your inftrument to D, and take the angle CDE; that is, place the inftrument at D; and, having fixed the index at the beginning of the graduations, turn the inftrument about till you perceive through the fights the object at C, and fix the inftrument in that pofition; then move the index, till you fee through the fights the object at E, and the degrees cut by the index will be the angle required. 9. Remove the inftrument to M, and take the angles KMB and KML after the preceding manner. 10. Having obferved the angles and meafured the diftances requifite on the weft fide of the harbour, remove your inftrument to the other fide and plant it at E, obferving the bearing of the line EF, meafuring its diftance, together with that of the perpendicular *g*, in all refpects as before; as alfo the lines FG, GH, HI, and their perpendiculars *h i k*, continuing the perpendicular *h* to the end of a ledge of rocks lying off that point. 11. Becaufe the cleft will interrupt your fight from the church at O, therefore you muft place your inftrument on the top of the cleft at *q*, and take the bearing of the church; and either meafure the diftance from your inftrument to it, or elfe remove your inftrument thither, and, having placed fignals at *q* and *s*, take the angle *q*O*s*. 12. Remove your inftrument at low-water to the fand at X, taking the bearings, and meafuring the diftances of the lines X*l* and *l r*, together with the perpendiculars *m*, *n*, *o*.

Having finifhed your obfervations, proceed to conftruct your map in the following manner.

1. Draw the eaft and weft line BA, fetting off on it the feveral diftances, *viz.* from A to R, A to *a*, &c. then by drawing the feveral perpendiculars, and making them of their proper lengths, you may eafily draw the tract of the furface of the water, and thofe which are above the line will give the places where the feveral objects are to be delineated.

2. By the help of your protractor or line of chords, make the feveral angles at A and R, equal to their refpective number of degrees, &c. drawing a right-line thro' each, which continue at pleafure.

3. Conftruct the angles at B in the fame manner, continuing the right-lines from this ftation till they cut thofe projected from A and R, which will be the true places of thofe objects; whence the fands Q, Y, and Z may be eafily drawn.

4. By projecting the angle ABM, and fetting off on the line BM its proper diftance, you will have the place where that church muft be delineated.

5. Conftruct the angles BCD and DCE, continuing the line CE at pleafure, and fet off its proper length on the line CD; then, by drawing the perpendicular *f* of its proper length, you may draw that part of the harbour between C and D.

6. Conftruct the angle at D, continuing the line DE till it cuts CE in E, which will give the place of the ftation at E.

7. By conftructing the angles ABK, ABL, BMK, and KML; and continuing the lines BK, BL, MK, and ML, till they cut each other in K and L; you will have the fituation of the objects at K and L.

8. Proceed in the fame manner on the other fide of the harbour, by projecting the lines EF, FG, GH, and HI, according to their feveral bearings, &c. and by drawing the feveral perpendiculars of their true length, the track of the furface of the water on the eaft fide of the harbour may be delineated; alfo, by continuing the perpendicular *h*, you will have the fituation of the ledge of rocks lying off that point.

9. Obferve to draw the appearance of the land; that is, from A to *d*, the fand-hills which lie along above the high-water mark, and the cleft which ftretches all along the eaft fide of the harbour.

10. In fome convenient place draw the compafs, but let it be in its true pofition without any variation; that is, obferve to allow for the variation, if any, which muft alfo be done before you begin your projection.

11. Draw the lines Q*t*K, QPM, *z w* O, *y*PL, and ZPK, which will fhew the marks neceffary to be obferved by fhips in coming into the harbour.

12. At low-water go off in your boat, and

and found the depth of the water in various places, which insert in your map; and observe the setting of the tide, which you must represent by darts. Also the time of high-water at the full and change of the moon, must be inserted in roman numbers.

13. Lastly, in some convenient place of your map insert a scale, of the same length of that which you made use of in the projection.

SURVEYOR, a person who hath the over-sight and care of considerable works, lands, or the like.

Such are the surveyor-general of the king's manors, surveyor of the king's exchange, surveyor-general of the works, surveyor-general of the crown-lands, *&c.*

SURVEYOR *of the melting*, is an officer of the mint, whose office is to see the bullion cast out, and that it be not altered after the delivery of it to the melter.

SURVEYOR *of the navy*, an officer whose business is to know the state of all stores, and see the wants supplied; to survey the hull, masts, and yards of ships; to audit the boatswain's and carpenter's accounts, *&c.*

SURVEYOR *of the ordnance*, is an officer whose charge is to survey all the king's ordnance, stores, and provisions of war, in custody of the store-keeper of the Tower of London; to allow all bills of debts; to keep checks on labourers and artificers works, *&c.*

SURVEYOR likewise denotes a gauger; as also a person who surveys lands, and makes maps of them.

SURVIVOR, in law, signifies the longest liver of joint-tenants, or of any two persons, jointly interested in a thing; in which case, if there be only two joint-tenants, upon the death of one, the whole goes to the survivor: and if there be more than two, the part of the deceased is divided among all the survivors.

SUS, the HOG-KIND, in zoology. See the article HOG.

SUS, in geography, a province of the empire of Morocco, lying on the Atlantic ocean, south of Morocco proper: its chief towns are Taradant and Tafilet.

SUSA, a fortified town of Piedmont, in Italy, situated on the river Doria, on the confines of France, eighteen miles north of Turin.

SUSDAL, a city of the province of Moscow, in Russia, one hundred miles north-east of Moscow.

SUSPENCE, in law, is held to be a temporary stop of a person's right; and takes place where a rent or other profit issuing out of land, on account of the unity of possession of the rent, *&c.* and of the land, whereout it issues, is not in esse for a time; but so as it may be revived afterwards, wherein it differs from extinguishment. See EXTINGUISHMENT.

SUSPENSION, or *Points of* SUSPENSION, in mechanics, are those points in the axis or beam of a balance, wherein the weights are applied, or from which they are suspended.

In a law-sense, suspension is a species of censure, whereby ecclesiastical persons are forbidden to exercise their office, or to take the profits of their benefices; or when they are prohibited in both of them for a certain time, either in whole or in part. Suspension is also said to relate to the laity, viz. *suspensio ab ingressu ecclesiæ*, i. e. from hearing divine service. See the article EXCOMMUNICATION.

SUSPENSION *of arms*, in war, a short truce agreed on by both armies, in order to bury the dead, wait for fresh instructions, or the like.

SUSPENSION, in rhetoric, is the carrying on a period or discourse, in such a manner as to keep the reader in expectation of something considerable in the conclusion. But great care must be taken, that the reader's expectation be not disappointed; for nothing is more contemptible, than to promise much and perform little; or to usher in an errant trifle, with the formality of preface, and solemn preparation.

SUSPENSOR, in anatomy, the same with the cremaster-muscle. See CREMASTER.

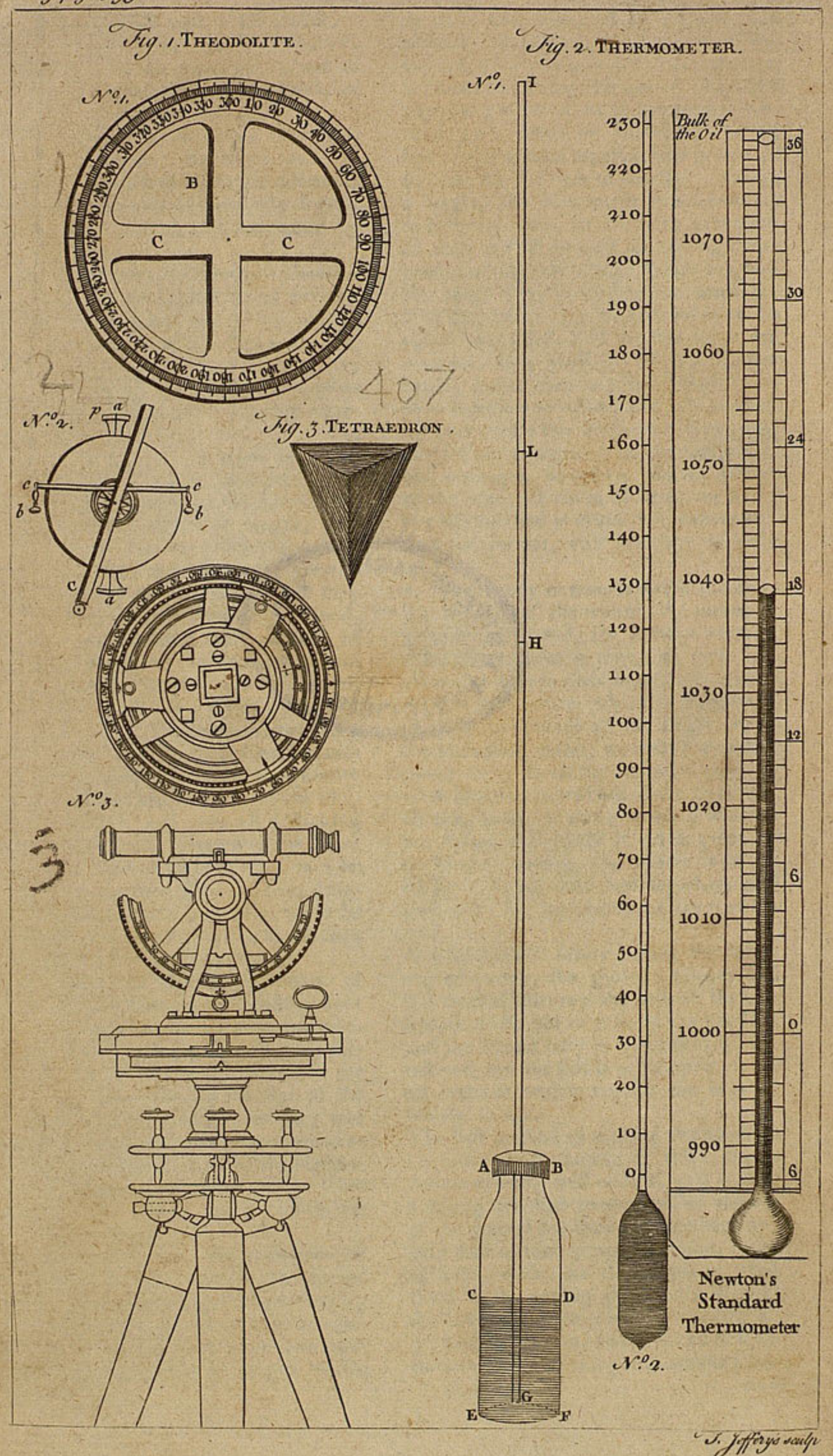
SUSPICION, in law. Persons may be taken up upon suspicion, where a felony is committed, *&c.* however, there must be at least some reasonable grounds for the same.

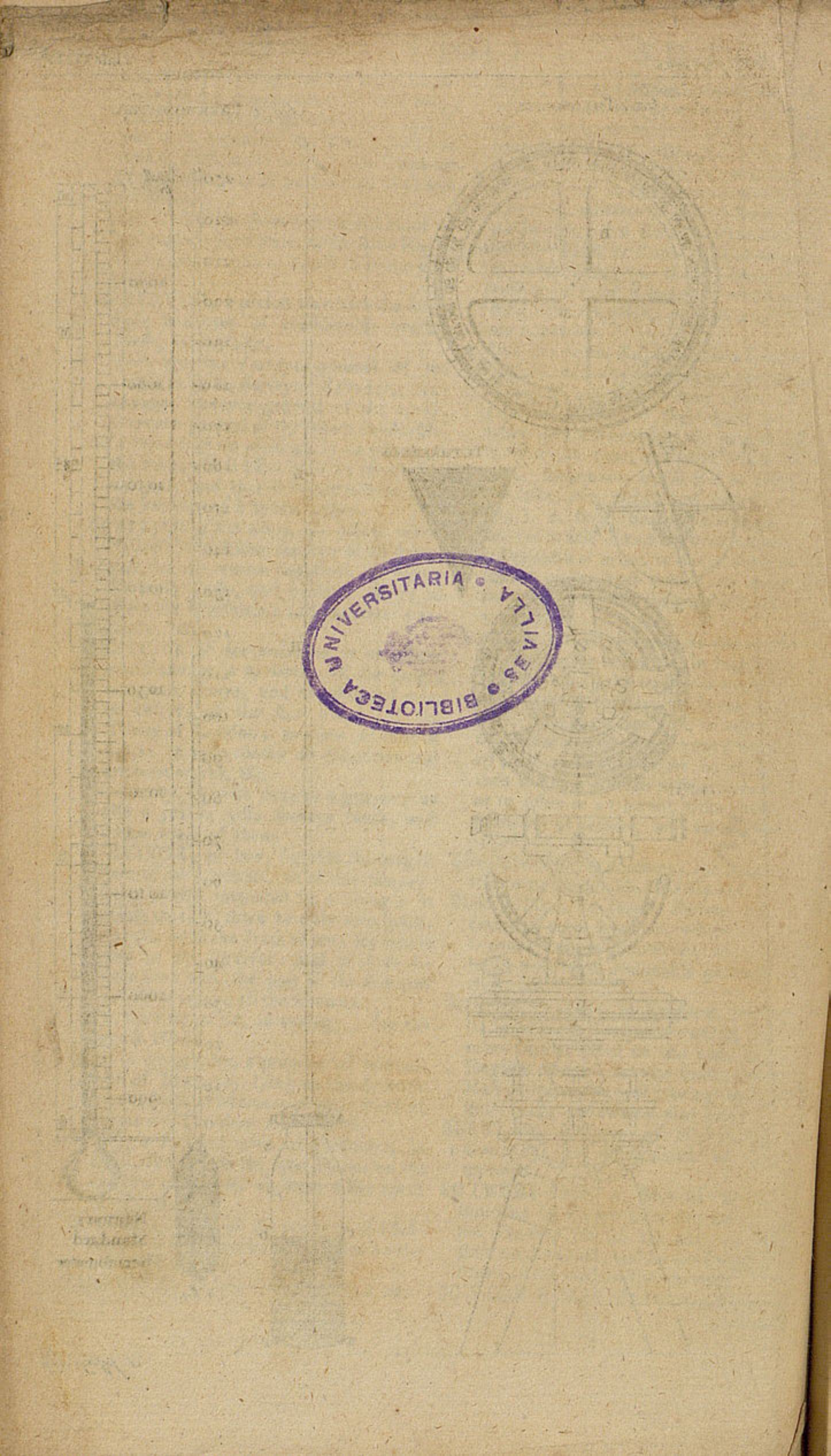
SUSSEX, a county of England, bounded by Surrey and Kent on the north, by another part of Kent on the east, by the English channel on the south, and by Hampshire on the west: being sixty-five miles long, and twenty-nine broad.

SUSTERN, a town of Westphalia, in Germany, ten miles south of Roermonde.

SUTHERLAND, a shire of Scotland, bounded by Cathness on the north, by the German sea on the east, by Ross-shire on the south, and by the Caledonian ocean on the west and north-west.

SUTTON-COLEFIELD, a market-town, twenty


Fig. 1. Theodolite.
No. 1.
B
C
C
No. 2.
No. 3.
Fig. 3. Tetraedron.
Fig. 2. Thermometer.
No. 1.
I
L
H
A
B
C
D
G
E
F
No. 2.
Bulk of the Oil
Newton's Standard Thermometer
J. Jefferys sculp.


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twenty miles north-weſt of Warwick.

SUTTON QUADRANT. See QUADRANT.

SUTURE, *ſutura*, in anatomy, a kind of articulation peculiar to the cranium, or ſkull. See the article SKULL.

SUTURE, in ſurgery, a method of uniting the lips of wounds. See WOUND.

Sutures differ, according to the difference of wounds, but may be generally divided into the dry, bloody, and compound ſutures.

1. The dry ſuture, called alſo the baſtard ſuture, is only the application of ſticking plaſters, to keep the lips of the wound united: it may be uſed in ſlight wounds, and eſpecially when they happen in the face; or, indeed, wherever it is capable of keeping the lips of the wound together: and as it gives no freſh pain, and occaſions no ſcar, it is much fitter for wounds of the face than the needle. The plaſters which are to form the dry ſuture, ſhould be of a ſufficient length, and ſhaped like the part to which they are to be applied, ſo as to ſurround the greateſt part of it, but not the whole, leſt they ſhould retard the circulation of the blood, and bring on tumours and miſchiefs of that kind: they muſt be alſo ſuch as will ſtick very faſt; the diachylon if good, or the common ſticking plaſter, are fitteſt for this purpoſe. The hæmorrhage being well ſtopped, and the wound well cleanſed, ſome vulnerary balſam of the gummy kind, as the balſam of Peru, or the like, is to be applied, and over all a ſticking plaſter is to be laid, adapted to the ſize of the part. Two or more of theſe may be applied, as occaſion ſhall require, leaving a ſpace between; and they are to be ſecured in their place, by the application of proper bolſters and bandages.

Petit's method of making the ſuture of this kind, is by letting the plaſters have one, two, or more openings in the middle, through which the ſurgeon may diſcover, as by the ſpaces left between in the former method, whether the lips of the wound are properly united, or not; and may alſo be able to apply proper remedies to the part, without removing the plaſters. Theſe plaſters are applied in the ſame manner as the former, and left on till the cure is completed.

But there is yet alſo another manner of performing the dry ſuture, *viz.* ſpread two plaſters upon ſtrong cloth, anſwering in ſize to the wound; to the ſides or margins of theſe, faſten three or four tape-ſtrings, according to the length of the wound; and then, after warming the plaſters, apply them at each ſide of the wound, at about a finger's breadth from it; after this, bring the lips of the wound together; dreſs it as in the former method, and, while an aſſiſtant keeps the lips of the wound together in a proper ſituation, tie the ends of the tapes, firſt in a ſingle, and afterwards in a ſlip-knot, to keep the parts in contact; over each of theſe ſhould be laid an oblong compreſs, and over all a large ſquare one, and the whole kept on by a proper bandage. The day following, the wound is to be again examined, and if the tapes are looſened, they muſt be drawn tighter again; but if they are not looſened, let them remain untouched, and only moiſten the part with a few drops of balſam, and cover them up again with the compreſſes and bandages, as before. Some, inſtead of the tape, uſe claſps of braſs, or ſteel; but this method is much leſs convenient than the former, and therefore is little uſed.

2. The bloody or true ſuture is the uniting the lips of the wound, by means of a needle and thread: for, in large wounds, eſpecially tranſverſe ones, as their lips cannot be kept in their ſituation by means of the dry ſuture, which is frequently the caſe in wounds of the thigh, or in the abdomen, nates, or arms; or when pieces hang from the wounded part, as often happens in wounds of the forehead, cheeks, noſe, or ears; or when wounds are large, and made in an angular or cruciform manner, the needle muſt be uſed, to bring their lips together; and this is called the bloody or the true ſuture.

To this kind of ſuture belong the interrupted ſuture, the glover's ſuture, and the twiſted ſuture: the laſt of theſe is ſeldom uſed, but in caſes of the harelip; and the ſecond only in wounds of the inteſtines; but the firſt is in common uſe for all wounds which require the true or bloody ſuture.

The beſt method of making the common or interrupted ſuture, is this: take a double thread, well waxed, paſs it thro' a ſtrong crooked needle; when the lips of the wound are brought together, and held firm in their proper ſituation, by an aſſiſtant, with one ſtroke pierce thro' them both, paſſing the needle through the lower lip from without inwards, almoſt to the bottom, and ſo on from within outwards, obſerving to make the punc-

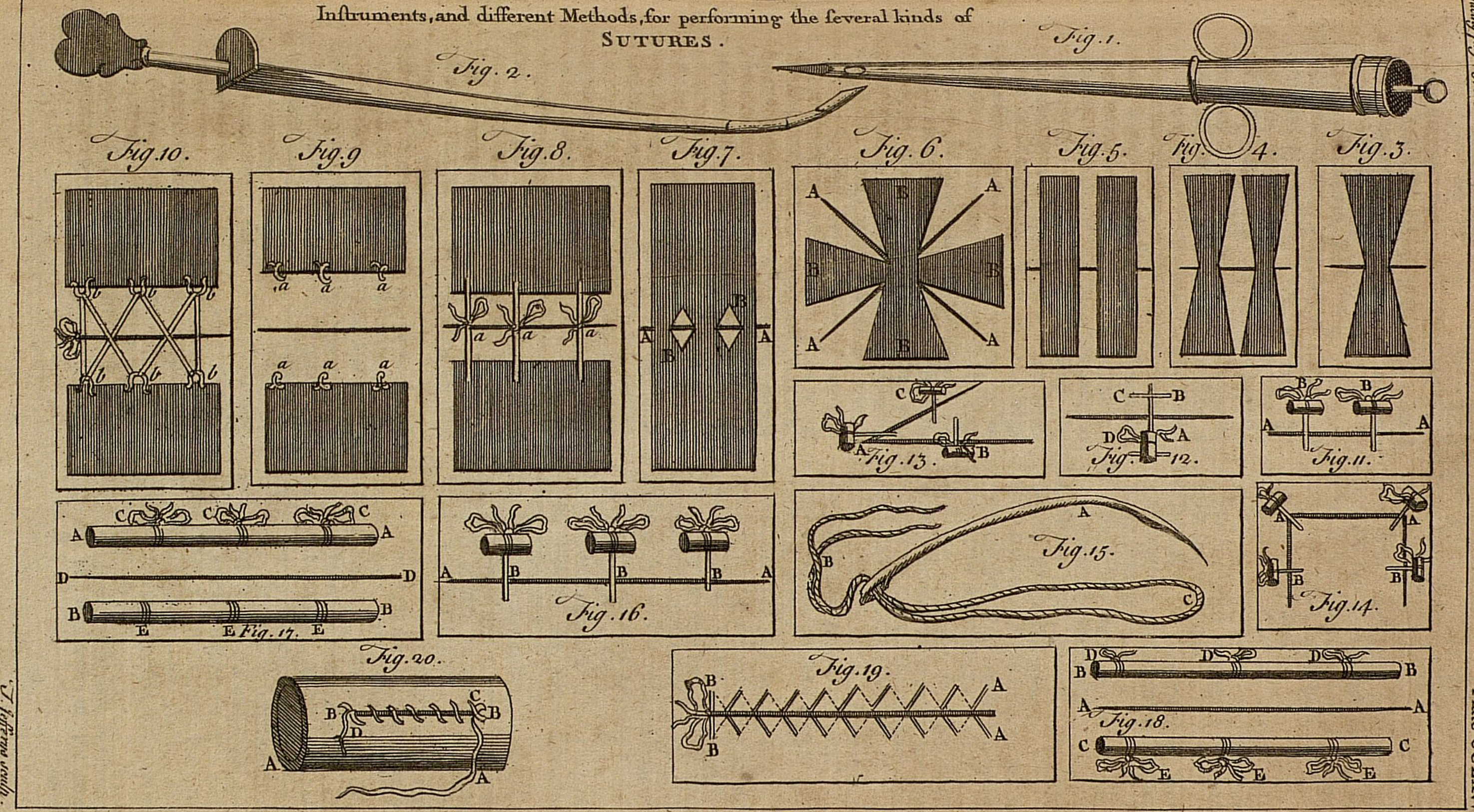
tures at a finger's breadth diſtance from the wound, which in this caſe we will ſuppoſe to be in length two fingers, varying this diſtance according to the ſize of the wound. After taking off the needle, tie the ends of the thread firſt in a ſingle knot, and then in a ſlip-knot, covering all with the ſame dreſſings as are uſed in the dry ſuture. But if the wound be ſo large, that one ſtitch will not be ſufficient, then two or more are to be made, according to the length of it, at about a finger's breadth diſtance one from the other. To prevent the knots from bringing on any miſchief, lay a ſmall linen-compreſs over the ſingle knot, and make the ſlip-knot over that; which, if any pain or inflammation ſhould ſucceed, may be afterwards eaſily looſened at pleaſure.

This is the method to be obſerved in ſtrait, oblique, or tranſverſe wounds; but where there are angles, as in a triangular wound, you are to proceed in the ſame manner, but obſerve to let the ſuture begin at the angle, and the other ſtitches to be taken about the middle, both ways; but if the wound be quadrangular, or have two angles, like the greek letter π, which ſometimes happens in the face, then the ſutures muſt be made in both the angles; and when the wound is ſo large, that theſe are not ſufficient, then as many more as are neceſſary muſt be made in the mid way between them. When you meet with a cruciform wound, and the lips of it cannot be kept together by the uſe of plaſters, the bloody ſuture muſt be made, by paſſing the needle through the lips, near the end of each extremity of the wound; and when all the ſtitches are thus made, the threads muſt be tied as in the other caſes.

3. A kind of bloody ſuture, which requires other aſſiſtances beſides the needle and thread. It was preferred by the antient ſurgeons to the common or interrupted ſuture, becauſe it prevented the lips of the wound from being lacerated, which ſometimes happened when the other method was uſed, and not only prevented the wound from uniting, but frequently brought on other grievous diſorders; and though this method has of late years been rejected, and particularly by Dionis, in his Surgery, yet many ſtill prefer it, in ſeveral caſes, to the common interrupted ſuture: but inſtead of the pieces of wood, uſed by the antients, thoſe, who now practiſe it, uſe pieces of plaſter, rolled up in a cylindrical form, of the length of the wound, and of about the ſize of a gooſe-quill, from whence it is called by ſome the quilled ſuture. This method prevents tumours, pain, and inflammations, which might be brought on by the hardneſs and preſſure of wood.

Palfynus performs this operation, in deep wounds of the muſcular parts, with a large and ſtrong crooked needle, furniſhed with a double thread well waxed, which has alſo a bow at one end. The needle thus fitted, being paſſed through both lips of the wound, in the ſame manner as in the other operations of the true ſuture, and afterwards a ſecond, and a third, paſſed in the ſame manner, a roll of plaſter is to be introduced into the bow-ends of the thread, which are left hanging out; then, when the needle is taken out at the other ſide, another roll of plaſter is to be placed between the ends of the thread; and the lips of the wound being brought together, theſe ends are to be gently tied over the roll, firſt in a ſingle, and then in a ſlip-knot: if there are three threads, the middle one ſhould be tied firſt, and then the reſt.

But, in order to illuſtrate this important article of ſurgery, we have given a plate (CCLXV.) of the inſtruments, and different methods, for performing the ſeveral kinds of ſutures; where fig. 1. is Petit's triangular needle. Fig. 2. is Heiſter's improvement of Petit's needle, which may be uſed where a ſtrait needle cannot with ſafety. Fig. 3. repreſents a wound, the lips of which are united by a ſticking plaſter, indented on both ſides. Fig. 4. ſhews a wound, to which two ſticking plaſters are applied. And fig. 5. a wound of the like nature, to which are applied two ſticking plaſters, without being indented. Fig. 6. repreſents a wound made croſs-ways, marked A,A,A,A, and united by two plaſters, laid likewiſe croſs-ways B,B,B,B. Fig. 7. is a wound, A, A, to which a ſticking plaſter is applied, with two openings in the middle, marked B, B. Fig. 8. is a wound, united by the application of two plaſters, with the tapes fixed to each of them; which are drawn together and faſtened by ſlip-knots, *a, a, a*. Fig. 9. is a like wound, united with plaſters of the ſame kind, only furniſhed with hooks, *a,a,a,a,a,a*, inſtead of tapes; by which, with the aſſiſtance of threads tied to them, the lips of the wound are drawn together. Fig. 10. is another method of doing the ſame



Instruments, and different Methods, for performing the several kinds of
SUTURES.
Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.
Fig. 11.
Fig. 12.
Fig. 13.
Fig. 14.
Fig. 15.
Fig. 16.
Fig. 17.
Fig. 18.
Fig. 19.
Fig. 20.
facing page 3126
Plate CCLXV.
J. Lodge sculp.

fame thing, by means of the fmall eyes *b, b, b, b, b, b,* inftead of the hooks, ufed by the antients. Fig. 11. is a tranfverfe wound, A, A, united by the interrupted future, B B. Fig. 12. fhews in what manner a crofs wound is to be ftitched up, and the lips of it brought together, by drawing the threads, A, B, C, D, tight. Fig. 13. fhews where the ftitches are to be made in a triangular wound, A B C. And fig. 14. how a wound, with two angles, is to be ftitched with the interrupted future; firft, at the angles A, A; and then, if neceffary, on each fide at B, B. Fig. 15. is a crooked needle, with a double thread, to make the quill-future; A being the needle, B the thread, and C the bow-end of the thread. Fig. 16. is a large tranfverfe wound, A A, united by the triple uninterrupted future, B, B, B. Fig. 17. is the fame kind of wound D, D, which is united by rolls of filk, AA, BB, covered with fome wax or plafter, and contained in the bow-ends of the threads, E, E, E, which are tied with flip-knots, C, C, C. Fig. 18. is another method of making the quill-future; A A being the wound, B B the upper-roll, C C the lower roll, D, D, D, the fingle knots which confine the upper-roll, and E, E, E, the flip-knots which fecure the lower roll. Fig. 19. reprefents Celfus's future for gaftroraphy; A A being the beginning of the ftitches, and B B the end, where they are faftened in a knot: but this Heifter reckons a bad method. Fig. 20. is the glovers future, ufed for uniting wounds of the inteftines; AA being the inteftine, B B the wound, C the beginning of the future, and D the end of the future, where it is faftened in a knot. See the article GASTRORAPHY.

For the future in the operation for the hare-lip, fee the article LIP.

SWABBER, an inferior officer on board fhips of war, whofe employment it is to fee that the decks are kept neat and clean.

SWABIA, a circle of the german empire, bounded by Franconia and the palatinate of the Rhine on the north, by Bavaria on the eaft, by Switzerland and Tyrol on the fouth, and by the river Rhine, which feparates it from Alfatia, on the weft; being one hundred and thirty miles long, and one hundred and ten broad.

SWAFFAM, a market-town of Norfolk, twenty-three miles weft of Norwich.

SWAINMOTE, or SWANIMOTE. See the article SWANIMOTE.

SWALBEA, in botany, a genus of the didynamia-angiofpermia clafs of plants, the ftigma of which is fimple, and the corolla perfonated: add to this, that the cup is quadrifid; the upper fegment being very fmall, and the lower one large, and emarginated.

SWALE, a river of Yorkfhire, which rifing on the confines of Weftmorland, runs fouth-eaft through Yorkfhire, and falls into the Oufe.

SWALLEY, a port-town of India, in the province of Cambaya, twelve miles north-weft of Surat.

SWALLOW, *hirundo*, in ornithology. See the article HIRUNDO.

SWALLOW-FISH, *hirundo*, in ichthyology. See the article HIRUNDO.

SWALLOW-WORT, in botany, the englifh name of feveral fpecies of afclepias. See the article ASCLEPIAS.

SWALLOW'S TAIL, in fortification, the fame with queue d'aronde. See QUEUE.

SWALLOW'S TAIL, in carpentry and joinery. See DOVE-TAILING.

SWALLOWING, or DEGLUTITION. See the article DEGLUTITION.

SWAN, *cygnus*, in ornithology. See the article CYGNUS.

SWANIMOTE, or SWAINMOTE, is a court touching matters of the foreft, held thrice a year, before the verderers as judges, by the fteward of the fwanimote: at this court all freeholders within the foreft owe fuit and fervice; alfo the officers thereof are there to appear, in order to prefent offences. See FOREST.

SWANSEY, a port-town of Glamorganfhire, fituated on the Briftol channel, thirty miles weft of Cardiff.

SWARDY, in agriculture, an appellation given to lands well covered with grafs.

SWARM *of bees*, in what manner hived, fee the article HIVING.

SWATH, *fafcia*, in furgery, a long and broad bandage, for binding up any difordered limb. See BANDAGE.

SWEARING, an offence punifhable by feveral ftatutes: thus, ftat. 6 and 7 Will. III. cap. 11. ordains, that if any perfon fhall profanely fwear, if he be a labourer, fervant, or common foldier, fhall forfeit 1 s. to the poor, for the firft offence, 2 s. for the fecond, *&c.* and any perfon not a fervant, *&c.* forfeits 2 s. for the firft offence, 4 s. for the fecond, 6 s. for the third, *&c.* to be levied by diftrefs of goods.

SWEAT, *fudor*, a fenfible moifture iffuing out of the pores of the fkins of

 animals,

animals. See the article PERSPIRATION.

Sweat, if it occasions no bad symptoms, is rather to be promoted than checked, even though it may seem profuse in quantity; and in this case the proper regimen is a moderate warmth, a quiet state of the body, and frequent draughts of warm liquors: but when the strength is found to be too much exhausted by these sweats, small doses of nitre are found of great service.

When different disorders arise from the suppression of sweats, nothing is of greater service than the compound powder of antimonium diaphoreticum, crab's eyes, and nitre, given in small doses, every three hours; and a quiet posture of the body is to be ordered, which greatly tends to promote sweating; and frequent draughts of warm and weak liquors are to be taken; and the bowels are to be relaxed with a clyster, or a gentle purge, if there be no symptom necessarily forbidding it. In regard to those persons, who are naturally very difficult to be sweated, a draught made of fresh arum-root and wine, or vinegar, usually brings on profuse sweating, if they are put to bed, and warm liquors drank afterwards. It is a very good general caution, that profuse sweats, if they have continued ever so many months, are never to be suppressed by astringents; for in that case they are usually attended with symptoms much worse than the original complaint. The common way of forcing out suppressed sweats by the hot alexipharmics and volatile salts, is by no means adviseable in any case. Bleeding, judiciously timed, is often of very great service in promoting sweats. When the natural sweats of children are repelled, they become suddenly feverish and ill, and nothing relieves them till the sweats are recalled. This may be done simply, by keeping them warmer than before, in most cases; but when that fails, the gentle absorbents are to be prescribed; and if they suck, the nurse may take the common alexipharmic medicines: crab's eyes are as proper as any thing for the child, in this case; and for the nurse, the lapis contrayerva. The convulsions of children very often arise from the suppression of their sweats, and are always then taken off, by making them sweat again.

Excessive sweating, in hectical and consumptive patients, being never salutary, should be diminished by light covering, attemperating powder of crab's eyes, with nitre, taken in the evening, to which may be added a grain or two of storax-pills, with a sufficient quantity of whey, or butter-milk, or an emulsion.

The copious sweats at the end of intermitting fevers, as also in the crisis of other fevers, are highly beneficial; and, therefore, ought to be promoted, by lying quietly in bed, and taking a sufficient quantity of a proper fluid, with diaphoretic potions. But should the patient sweat too much after the cure of a fever, he ought to drink bitters, twice or thrice a day, with a fourth part of the essence of eleutheria; and at night to take a dose of the species of hyacinth, with a grain or two of storax-pills.

SWEATING-SICKNESS. See the article SUDOR ANGLICANUS.

SWEDEN, one of the most northerly kingdoms of Europe, bounded by norwegian Lapland on the north, by Russia on the east, by the Baltic sea on the south, and by Norway on the west; being upwards of eight hundred miles from north to south, and five hundred from east to west.

SWEEP, in the sea-language, is that part of the mould of a ship, where she begins to compass in at the rung-heads: also, when the hawser is dragged along the bottom of the sea, to recover any thing that is sunk, they call this action sweeping for it.

SWEET, in the wine-trade, denotes any vegetable juice, whether obtained by means of sugar, raisins, or other foreign or domestic fruit, which is added to wines, with a design to improve them. See the article WINE.

It is plain, says Dr. Shaw, from the making of artificial must, or stum, by means of fine sugar, with a small addition of tartar, that the art of sweet-making might receive a high degree of improvement, by the using pure sugar, as one general wholesome sweet, instead of those infinite mixtures of honey, raisins, syrups, treacle, stum, cyder, &c. wherewith the sweet-makers supply the wine-coopers, to lengthen out or amend their wines: for pure sugar being added to any poor wine, will ferment therewith, and improve it, and bring it to a proper degree of strength and vinosity. If the wine that is to be amended is tart of itself, no tartar should be added to the sugar; but if it be too sweet or luscious, then the addition of tartar is necessary.

SWEET-ALMONDS. See ALMONDS.

SWEET-SUBLIMATE *of mercury*, the same with

with mercurius dulcis. See the articles MERCURY and CALOMEL.

SWEET-WILLIAMS, in botany, the englifh name of feveral beautiful fpecies of caryophyllus, or dianthus. See DIANTHUS.

SWELLING, in furgery. See the articles INFLAMMATION and TUMOUR.

SWERIN, a town of lower Saxony, in Germany, capital of the dutchy of Mecklenburg, and fituated on the lake of Swerin, in eaft longit. 11° 30′, and north lat. 54°.

SWERNICK, a town of european Turky, fituated on the river Drino, on the confines of Servia and Bofnia: eaft long. 20°, north lat. 44° 30′.

SWERTIA, in botany, a genus of the pentandria-digynia clafs of plants, the corolla whereof confifts of a fingle petal, with a plane limb, divided into five fublanceolated fegments; the fruit is a cylindric capfule, pointed at each end, with only one cell, in which are included numerous fmall feeds.

SWIFTERS, in a fhip, are ropes belonging to the fore and main-fhrouds, for fecuring thofe mafts.

SWIFTING *a boat*, is encompaffing her gun-wale with a ftrong rope: fwifting a fhip, is either bringing her a-ground, or upon a careen: and fwifting the capftan-bars, is ftraining a rope all round the outer ends of them, to prevent their flying out of the drum-head.

SWIMMING, the art or act of fuftaining the body in water, and of moving therein; in which action the air-bladder and fins of fifhes bear a confiderable part. See the articles AIR-BLADDER and FIN.

Some have fuppofed, that the motion of fifh in the water, depends principally upon the pectoral fins, but the contrary is eafily proved by experiment; for if the pectoral fins of a fifh are cut off, and it be again put into the water, it will be found to move forward or fideways, upward or downward, as well as it did when it had them on. If a fifh be carefully obferved, while fwimming in a bafon of clear water, it will be found not to keep thefe pectoral fins conftantly expanded, but only to open them at fuch times as it would ftop or change its courfe; this feeming to be their principal, if not their only, ufe. The pectoral and ventral fins, in the common fifhes of a compreffed form, ferve in the fame manner in keeping the fifh ftill, and ferve in fcarce any other motion than that towards the bottom; fo that this motion of the fifh, which has been generally attributed to their fins, is almoft wholly owing to their mufcles, and the equipoife of their air-bladder. That the ufe of the pectoral and ventral fins is to keep the fifh fteady and upright in the water, is evident from the confequences of their lofs: if they are cut off, and the fifh put again into the water, it cannot continue in its natural erect pofture, but ftaggers about and rolls from fide to fide. The fins of the back and anus are alfo of great ufe to the keeping the creature in its natural pofition, as is eafily feen by cutting them off, and obferving the motions of the fifh afterwards.

Though a great deal depends on the motion of the mufcles of the feveral parts of the body, in the fwimming of the fifh, yet the tail, and thofe mufcles which move the lower part of the body, to which it is affixed, are the great inftruments by which their fwift motions in the water are performed. The moving the tail, and that part of the body to which it adheres, backward and forward, or fideways any one way, throws the whole body of the fifh ftrongly the contrary way; and even in fwimming ftrait forward, the motion and direction are both greatly affifted by the vibrations of this part, as may be experienced in the motion of a boat, which, when impelled forward, may be firmly guided by means of an oar held out at its ftern, and moved in the water as occafion directs. The dorfal mufcles, and thofe of the lower part of the body between the anus and tail, are the principal that are ufed in the motion of this part, and thefe are therefore the moft ufeful to the fifh in fwimming. The mufcles of the belly feem to have their principal ufe in the contracting the belly and the air-bladder. They have been fuppofed of ufe to move the belly-fins; but there are too many of them for fuch a purpofe, and thefe fins have each its peculiar mufcle fully fufficient to the bufinefs. The ufe of the tail in fwimming is eafily feen, by cutting it off, and committing the fifh to the water without it, in which cafe it is a moft helplefs creature.

Let A B (plate CCLXII. fig. 5. n° 1.) be a fifh fwimming, by expanding or contracting its air-bladder L, it can rife or fink in the water at pleafure; and its direct motion is performed by means of its tail B C D, vibrating from one fide to another, which is performed thus; fuppofe the tail in the pofition F G (*ibid.* n° 2.)

a.) being about to be moved fucceffively to H, I, and K; the fifh firft turns the end G, oblique to the water, and moves it quickly towards K; the refiftance of the water, acting in the mean time obliquely, moves him partly forward and partly fideways, but this lateral motion is corrected by the next ftroke, from K towards I, H, and G; which is performed by turning the tail obliquely the contrary way to what it was in the firft ftroke. By the help of the tail they alfo turn about, by ftriking ftrongly with it on one fide, and keeping it bent, fo as to act like the rudder of a fhip. The fins, efpecially the pectoral ones E, E, ferve to keep the fifh upright, as alfo to afcend and defcend.

Brutes fwim naturally, but men attain this art by practice and induftry: it confifts principally in ftriking alternately with the hands and feet; which, like oars, row a perfon forward: he muft keep his body a little oblique, that he may the more eafily erect his head, and keep his mouth above water.

SWINDON, a market-town of Wiltfhire, twenty-five miles north of Salifbury.

SWINE, in zoology, a general name for the fus or hog-kind. See HOG.

Swine are very profitable creatures to the owner, being kept at fmall expence, feeding on things that would be otherwife thrown away, and producing a very large increafe. They are apt to dig up the ground, and break fences; but this may be prevented, by putting rings in their nofes, and yoaks about their necks.

For the properties of a boar, kept for breeding, fee the article BOAR.

SWINGLING, the beating of flax, or hemp, after it has been well broken with the brake: this is done by taking up the flax in handfuls, and then beating it with a rod, or flatted and fmooth ftick, in order to free it from the bun, and prepare it for being heckled. See the articles FLAX and HEMP.

SWITZ, or SWISSE, the capital of one of the cantons of Switzerland, to which it gives name, fituated on the eaft fide of the lake of Lucern, fixteen miles fouth-eaft of the city of Lucern: eaft long. 8° 30′, and north lat. 47°.

SWITZERLAND, or SWISSERLAND, called Helvetia by the Romans, is furrounded by the territories of Germany, France, and Italy, being about two hundred and fixteen miles long, and upwards of one hundred miles broad.

The feveral cantons or provinces of Switzerland, which are thirteen in number, have been mentioned under their refpective heads BERN, BASIL, &c.

SWOLL, or ZWOLL, a town of the United Netherlands, fituated in the province of Overyffel: eaft long. 6°, and north lat. 52° 37′.

SWOONING, in medicine, a fpecies of lipothymy, wherein the patient is deprived of all fenfe and motion. See the article LIPOTHYMIA.

SWORD, *gladius*, an offenfive weapon worn at the fide, and ferving either to cut or ftab: its parts are the handle, guard, and blade; to which may be added the bow, fcabbard, pummel, &c. Fencing-mafters, however, divide the fword into the upper, middle, and lower part; or the fort, middle, and foible. See the article FENCING.

SWORD-FISH, *xiphias*. See XIPHIAS.

SWORD-HAND, in horfemanfhip. See the article HAND.

SYCAMORE-TREE, in botany, the englifh name of the acer major, or greater maple. See the article MAPLE.

SYCOPHANT, συκοφαντης, an appellation given by the antient Athenians to thofe who informed of the exportation of figs, contrary to law; and hence it is ftill ufed in general for all informers, parafites, flatterers, cheats, &c.

SYLLABIC AUGMENTS, in greek grammar. See the article AUGMENT.

SYLLABLE, συλλαβη, in grammar, a part of a word, confifting of one or more letters, pronounced together. See the articles WORD and PRONUNCIATION.

According as words contain one, two, three, four, &c. fyllables, they are denominated monofyllables, biffyllables, triffyllables, tetrafyllables, polyfyllables, &c. and the divifion of a word, into its conftituent fyllables, is called fpelling. See the article SPELLING.

SYLLABUB, a compound liquor, made of white wine and fugar, into which is fquirted new milk with a fyringe. If cream be ufed inftead of milk, it is called whipt fyllabub.

SYLLABUS, in matters of literature, denotes a table of contents, or an index of the chief heads of a book or difcourfe.

SYLLEPSIS, in latin and greek grammar, is the agreement of a verb or adjective, not with the word next it, but with the word moft worthy in the fentence.

Syllepfis is threefold: 1. Of gender, when the adjective agrees with the maf-

culine noun, preferable to the feminine; as, *rex & regina beati*. 2. Of person, when the verb agrees with the firft, or fecond, perfon, preferably to the fecond, or third; as, *erraftis, Rulle, vehementer, & tu & collegæ tui*. 3. Of number, when the adjective or verb agrees with a noun plural preferably to one fingular; as *Phrygii comites & lætus Julus incedunt*.

SYLLOGISM, συλλογισμος, in logic, an argument or term of reafoning, confifting of three propofitions; the two firft of which are called premifes, and the laft the conclufion. See the articles REASONING, PROPOSITION, *&c.*

Syllogifms are nothing but the expreffions of our reafonings, reduced to form and method: and hence, as every act of reafoning implies three feveral judgments, fo every fyllogifm muft include three diftinct propofitions. Thus, in the following fyllogifm:

Every creature poffeffed of reafon and liberty is accountable for his actions.
Man is a creature poffeffed of reafon and liberty:
Therefore man is accountable for his actions.

We may obferve that there are three feveral propofitions, expreffing the three judgments implied in the act of reafoning: the two firft propofitions anfwer the two previous judgments in reafoning, and are hence called premifes; as being placed before the other, which is termed the conclufion. We are alfo to remember, that the terms expreffing the two ideas whofe relation we enquire after, as here, *man* and *accountablenefs*, are in general called the extremes; and that the intermediate idea, by means of which the agreement or difagreement of the two extremes is traced, *viz. a creature poffeffed of reafon and liberty*, takes the name of the middle term. Hence, by the premiffes of a fyllogifm, we are always to underftand the two propofitions where the middle term is feverally compared to the two extremes; for thefe conftitute the previous judgments, whence the truth we are in queft of is by reafoning deduced. The conclufion is that other propofition, in which the extremes themfelves are joined or feparated, agreeably to what appears upon the above comparifon. See PREMISES and CONCLUSION.

As, therefore, the conclufion is made up of the extreme terms of the fyllogifm; fo that extreme, which ferves as the predicate of the conclufion, goes by the name of the major term; and the other term, or fubject of the conclufion, is called the minor term. From this diftinction of the extremes arifes alfo a diftinction between the premifes; that propofition, which compares the greater extreme with the middle term, being called the major propofition; and the other, where the leffer extreme is compared with the middle term, being called the minor propofition. See TERM, PREDICATE, *&c.* In a fingle act of reafoning, the premifes of the fyllogifm muft be felf-evident truths, otherwife the conclufion could not follow. For inftance, in the major of the above-mentioned fyllogifm, *viz. every creature poffeffed of reafon and liberty is accountable for his actions*, if the connection between the fubject and predicate could not be perceived by a bare attention to the ideas themfelves, the propofition would require a proof itfelf; in which cafe, a new middle term muft be fought for, and a new fyllogifm formed to prove the faid major: and fhould it fo happen, that in this fecond effay there was ftill fome propofition whofe truth did not appear at firft fight, recourfe muft be had to a third fyllogifm to prove it. And when, by conducting our thoughts in this manner, we at laft arrive at fome fyllogifm, where the premifes or previous propofitions are intuitive or felf-evident truths; the mind then refts in full fecurity, as perceiving that the feveral conclufions it has paffed thro' ftand upon the immoveable foundation of felf-evidence, and when traced to their fource terminate in it. The great art lies, in fo adjufting our fyllogifms to one another, that the propofitions feverally made ufe of as premifes may be manifeft confequences of what goes before, fo as to form one connected demonftration. See the article DEMONSTRATION.

With refpect to the different forms or figures of fyllogifms, it frequently happens that the middle term is the fubject of the major term, and the predicate of the minor: but though this difpofition of the middle term be the moft natural and obvious, it is not, however, neceffary; fince the middle term is often the fubject of both the premifes, or the predicate in both; and fometimes it is the predicate in the major, and the fubject in the minor propofition. Now this variety in the order and difpofition of the middle term, conftitutes what logicians call the forms or figures of fyllogifm. See FIGURE.

But

But besides this distinction of syllogisms into different figures, there is also a farther subdivision of them in every figure, called modes, or moods. See Mood.

These distinctions of syllogism, according to figure and mood, respects chiefly simple syllogisms, or those limited to three propositions, all simple; and where the extremes and middle term are connected immediately together. But as the mind is not tied down to any one form of reasoning, but sometimes makes use of more, sometimes of fewer premises, and often takes in compound and conditional propositions, there hence arises other distinctions of syllogisms.

When in any syllogism the major is a conditional proposition, the syllogism itself is termed conditional. Such is the following one:

If there is a God, he ought to be worshipped;
But there is a God:
Therefore he ought to be worshipped.

In syllogisms of this kind, the relation between the antecedent, or the conditional part *if there is a God*, and the consequent *he ought to be worshipped*, must ever be real and true; that is the antecedent must always contain some certain and genuine condition, which necessarily implies the consequent; otherwise the proposition itself will be false, and therefore ought not to be admitted into our reasonings. There are two kinds of conditional syllogisms, one of which is called in the schools modus ponens; because from the admission of the antecedent they argue to the admission of the consequent, as in the syllogism above: the other is called modus tollens, because in it both antecedent and consequent are rejected, as in the following syllogism:

If God were not a being of infinite goodness, neither would he consult the happiness of his creatures;
But God does consult the happiness of his creatures;
Therefore he is a being of infinite goodness.

Again, as from the major's being a conditional proposition, we obtain conditional syllogisms; so where it is a disjunctive proposition, the syllogism is also called disjunctive, as in the following example.

The world is either self-existent, or the work of some finite, or some infinite being.
But it is not self-existent, nor the work of a finite being:
Therefore it is the work of an infinite being.

Now a disjunctive proposition is that, where of several predicates, we affirm one necessarily to belong to the subject, to the exclusion of all the rest, but leave that particular one undetermined: hence it follows, that as soon as we determine the particular predicate, all the rest are to be of course rejected; or if we reject all the predicates but one, that one necessarily takes place. When, therefore, in a disjunctive syllogism, the several predicates are enumerated in the major; if the minor establishes any one of these predicates, the conclusion ought to remove all the rest; or if in the minor, all the predicates but one are removed, the conclusion must necessarily establish that one.

In the several kinds of syllogisms hitherto mentioned, we may observe, that the parts are complete; that is, the three propositions of which they consist, are expressed in form. But it often happens, that some one of these premises is not only an evident truth, but also familiar and in the mouths of all men; in which case it is usually omitted, whereby we have an imperfect syllogism, that seems to be made up of only two propositions; such is the following one:

Every man is mortal;
Therefore every king is mortal.

Here the minor proposition, *every king is man*, is omitted, as being so clear and evident, that the reader may easily supply it.

SYMBOL, συμβολον, a sign or representation of something moral, by the figures or properties of natural things.

Hence symbols are of various kinds, as hieroglyphics, types, ænigmas, parables, fables, &c. See Hieroglyphics, &c.

Among christians, the term symbol denotes the apostles creed. See Creed.

SYMMETRY, συμμετρια, the just proportion of the several parts of any thing, so as to compose a beautiful whole.

SYMPATHETIC, something that acts, or is acted on, by sympathy: thus we say, sympathetic diseases, inks, powders, &c. See Disease, &c.

Sympathetic ink. See the article *Sympathetic* ink.

Sympathetic powder. The composition of the famous sympathetic powder, used

used at Goffelaer by the miners in all their wounds, is this. Take of green vitriol, eight ounces; of gum tragacanth, reduced to an impalpable powder, one ounce; mix these together, and let a small quantity of the powder be sprinkled on the wound, and it immediately stops the bleeding. The vitriol is to be calcined to whiteness in the sun, before it is mixed with the gum.

SYMPATHY, συμπαθεια, an agreement of affections and inclinations, or a conformity of natural qualities, humours, temperaments, &c. which make two persons delighted and pleased with each other.

In medicine, sympathy denotes an indisposition befalling one part of the body, through the defect or disorder of another; whether it be from the affluence of some humour, or vapour sent from elsewhere; or from the want of the influence of some matter necessary to its action. See the article CONSENT *of parts.*

SYMPEXIUM, in natural history, a genus of stones, of a fine, close, compact, and firm texture, and of a plain, uniform structure, splitting with equal ease in any direction. See the article STONE.

Of this genus there are four different kinds, under each of which are reckoned several species. 1. The white, or whitish rock stone comprehends the dense, dull-looking, whitish sympexium; the hard, greyish, white, dull sympexium; the hard, porous sympexium; the hard, bright, grey sympexium; the hard, bright, brownish, white sympexium; the dull, yellowish, white, hard sympexium; the dull, hard, brownish, white sympexium; the whitish, grey, marbly sympexium; the yellowish, white, flinty sympexium; and the brownish, white, flinty sympexium. 2. The bluish sympexium comprehends the bluish, flinty sympexium; the hard, bluish sympexium; and the brownish, blue, dull, hard sympexium. 3. The reddish comprehends the dull, pale, red sympexium; and the hard, shining, red sympexium; and the green and red, variegated sympexium. 4. The black comprehending the hard, black, dull sympexium; the hard, black, shining sympexium; and the soft, dull, black sympexium.

SYMPHONY, συμφωνια, in music, properly denotes a consonance or concert of several sounds agreeable to the ear, whether vocal or instrumental, called also harmony. See the articles HARMONY and CONCERT.

SYMPHYSIS, in anatomy, one of the kinds of junctures, or articulation, of the bones. See ARTICULATION.

Symphysis is twofold. 1. Without a medium, or any thing between the two bones; which coalesce or touch each other: such is the articulation in the os frontis, the upper maxilla, the ossa innominata, &c. 2. By the intervention of a medium, or substance different from the bones themselves; as in the vertebræ, the sutures of the skull, the scapula and gums. See VERTEBRÆ, SKULL, &c.

SYMPHYTUM, COMFREY, in botany, a genus of the pentandria-monogynia class of plants, with a monopetalous flower, quinquedentated at the limb: there is no pericarpium; the seeds, which are four in number and gibbous, being contained in the cup.

Comfrey-root agrees in medicinal virtues with those of althæa. See the article ALTHÆA.

SYMPLEXIUM, in natural history, the name of a genus of fossils, of the class of the selenitæ, but not of the determinate and regular figure of most of the genera of those bodies, but composed of various irregular connections of differently shaped, and usually imperfect bodies. See the article SELENITÆ.

SYMPOSIARCH, συμποσιαρχης, in antiquity, the director, or manager of an entertainment. This office was sometimes performed by the person at whose charge the entertainment was provided; sometimes by another named by him; and at other times, especially in entertainments provided at the common expence, he was elected by lot, or by the suffrages of the guests. He was otherwise called *basileus, rex*, and *modimperator*, &c. and determined the laws of good fellowship, observed whether every man drank his proportion, whence he was called *ophthalmus, oculus*, the *eye*.

SYMPTOM, συμπτωμα, in medicine, any appearance in a disease, which serves to indicate or point out its cause, approach, duration, event, &c. See the articles DISEASE, INDICATION, &c.

In a strict sense, however, symptom means no more than the consequences of diseases, and of their causes, exclusive of the diseases and causes themselves; and so is no other than a preternatural affection, which follows the disease, as the shadow follows the body.

SYMPTOMATICAL, in medicine, is a term often used to denote the difference between

between the primary and fecondary caufes in difeafes: thus a fever from pain is faid to be fymptomatical, becaufe it rifes from pain only; and therefore the ordinary means in fevers are not in fuch cafes to be had recourfe to, but to what will remove the pain; for, when that ceafes, the fever will ceafe without any direct means taken for it.

SYNÆRESIS, συναίρεσις, contraction in grammar, a figure whereby two fyllables are united in one; as *vemens* for *vehemens*.

SYNAGOGUE, *fynagoga*, a particular affembly of Jews met to perform the offices of their religion. Alfo the place wherein they meet.

SYNALOEPHA, συναλοιφη, in grammar, a contraction of fyllables, performed principally by fuppreffing fome vowel or diphthong at the end of a word, on account of another vowel or diphthong at the beginning of the next. As *ill' ego*, for *ille ego*, &c.

SYNARTHROSIS, in anatomy, a fpecies of articulation, wherein there is only an obfcure motion, as in the bones of the carpus and metacarpus, the tarfus and metatarfus, *&c.* or there is no motion at all, as in the futures of the fkull, and articulations per harmoniam or bare application. See CARPUS, *&c.*

SYNCHONDROSIS, in anatomy, a fpecies of fymphyfis; being the union of two bones by means of a cartilage, as in the vertebræ.

SYNCHRONISM, συγχρονισμος, denotes the happening of feveral things in the fame time: for if in equal times, it is more properly called ifochronifm. See the articles ISOCHRONAL.

SYNCOPATION, in mufic, denotes a ftriking or beating of time, whereby the diftinction of the feveral times or parts of the meafure is interrupted.

However, it is more properly ufed for the connecting the laft note of any meafure, or bar, with the firft of the following meafure; fo as only to make one note of both.

A fyncope is fometimes alfo made in the middle of a meafure.

Syncopation is alfo ufed when a note of one part ends or terminates on the middle of a note of the other part. This is otherwife denominated binding.

It is likewife ufed for a driving note; that is, when fome fhorter note at the beginning of a meafure, or half meafure, is followed by two, three, or more longer notes before another fhort note occurs, equal to that which occafioned the driving, to make the number even, *e. gr.* when an odd crotchet comes before two or three minims, or an odd quaver before two, three, or more crotchets.

In fyncopated or driving notes, the hand or foot is taken up, or put down, while the note is founding.

SYNCOPE, FAINTING, in medicine, a deep and fudden fwooning, wherein the patient continues without any fenfible heat, motion, fenfe, or refpiration, and is feized with a cold fweat over the whole body, and all the parts turn pale and cold as if dead. See LIPOTHYMIA.

SYNCOPE, in grammar, an elifion or retrenchment of a letter or fyllable out of the middle of a word, as *caldus* for *calidus*, *afpris* for *afperis*, &c.

SYNDESMUS, in anatomy, a word ufed for a ligament. See LIGAMENT.

In grammar, fyndefmus is ufed for a conjunction.

SYNDIC, in government and commerce, an officer in divers countries intrufted with the affairs of a city, or other community, who calls meetings, makes reprefentations and folicitations to the miniftry, magiftracy, *&c.* according to the exigency of the cafe. The fyndic is appointed to anfwer and account for the conduct of the body, he makes and receives propofals for the advantage thereof, controuls and corrects the failings of particular perfons of the body, or at leaft procures their correction at a public meeting. In effect, the fyndic is at the fame time both the agent and cenfor of the community. Almoft all the companies in Paris, as the univerfity, companies of arts and trades, have their fyndics, and fo have moft of the cities of Provence and Languedoc.

Syndic is alfo ufed for a perfon appointed to follicit fome common affair wherein he himfelf has a fhare, as happens particularly among the feveral creditors of the fame debtor who fails or dies infolvent. The chief magiftrate of Geneva is alfo called fyndic. There are alfo four fyndics chofen every year, the eldeft of whom prefides in the council of twenty-five, which is the chief council of the city, wherein all affairs are difpatched, both civil and political; thus the three other elect cannot all come at the office till the four years end, fo that the fyndicate rolls among fixteen perfons all chofen out of the council of twenty-five.

SYN-

SYNDROME, a word introduced into medicine by the empirics, who mean by it a concourſe of ſymptoms: thus under a plethora an empiric judges veneſection neceſſary from a ſyndrome of ſymptoms, ſuch as diſtention of the veſſels, a redneſs and gravity of the whole body, an indiſpoſition to motion, tenſions of the limbs, and a ſenſe of an ulcerous laſſitude, beſides a life ſpent in idleneſs, high and full feeding, and a ſuppreſſion of wonted excretions. This is the plethoric ſyndrome of an empiric, and after the ſame manner he forms a ſyndrome or concourſe of ſymptoms in a peripneumony, quinſey, epilepſy, and other diſeaſes. Galen ridicules theſe ſyndromes, becauſe, he ſays, they happen very rarely, and alſo very ſlowly; ſo that ſhould a phyſician wait for a ſyndrome of all the ſymptoms he expects, he might adminiſter his remedies too late.

SYNECDOCHE, in rhetoric, a kind of figure or rather trope, frequent among orators and poets. There are three kinds of ſynecdoches; by the firſt, a part is taken for the whole, as the point for the ſword, the roof for the houſe, the ſails for the ſhip, *&c.* By the ſecond, the whole is uſed for a part. By the third, the matter whereof the thing is made is uſed for the thing itſelf; as ſteel for ſword, ſilver for money, *&c.* To which may be added another kind, when the ſpecies is uſed for the genus, or the genus for the ſpecies.

SYNECDOCHE, in greek and latin grammar, is when the ablative of a part or an adjunct of a ſentence is changed into the accuſative, the greek propoſition κατα, or the latin *ſecundum*, or *quod ad*, being underſtood. Examples of the ablative of the part being changed into the accuſative, are the following from Virgil. *Expleri mentem nequit*, for *quod ad mentem*; and *Deiphobum videt lacerum crudeliter ora*, for *quod ad ora*; and an example of the ablative of the adjunct being changed into the accuſative from the ſame author, is as follows. *Flores inſcripti nomina regum*, for *quod ad nomina regum*.

SYNECPHONESIS, or SYMPHONESIS, in grammar, a coalition whereby two ſyllables are pronounced as one, being much the ſame as the ſynalœpha, or ſynæreſis. See the articles SYNALOEPHA and SYNÆRESIS.

SYNEDRIN, or SYNEDRION. See the article SANHEDRIN.

SYNGENESIA, συγγενεσια, in botany, one of Linnæus's claſſes of plants, the nineteenth in order; ſo called becauſe the ſtamina in theſe plants grow together, or are formed into a ſingle regular congeries.

The general characters of this claſs are theſe: the cup is the crown of the ſeeds, and ſtands on the ſummit of the germen; and the compound flowers are very various, in regard to the nature of the floſcules. 1. Some are compoſed of tubuloſe hermaphrodite flowers in the diſk, and of the ſame ſort of tubulous hermaphrodite flowers in the radius. 2. Others are compoſed of tubuloſe hermaphrodite flowers in the diſk, and of tubulous female flowers in the radius. 3. Some are compoſed of tubulous hermaphrodite flowers in the diſk, and of tubuloſe neutral flowers in the radius. 4. Some have tubuloſe hermaphrodite flowers in the diſk, and ligulated hermaphrodite flowers in the radius. 5. Some are compoſed of tubulous hermaphrodite flowers in the diſk, and of ligulated female flowers in the radius. 6. Some are compoſed of tubulous hermaphrodite flowers in the diſk, and ligulated neutral flowers in the radius. 7. Some are compoſed of tubulous hermaphrodite flowers in the diſk, and of naked and neutral flowers in the radius. 8. Some are compoſed of tubuloſe male flowers in the diſk, and of naked female flowers in the radius. And, 9. Some are compoſed of ligulated female flowers in the diſk, and ligulated hermaphrodite flowers in the radius.

The ſtamina are five very ſhort and ſlender filaments, inſerted into the tube of the flower. The antheræ are of the ſame number with the ſtamina: they are ſlender, erect, and grow together at their ſides, ſo as to form a tubular cylindric body of the length of the mouth of the flower, and divided into five ſegments at the edge. The germen of the piſtil is oblong, and placed under the receptacle of the flower. The ſtyle is capillary, erect, and of the length of the ſtamina, and goes through the cylinder formed by the antheræ. The ſtigma is divided into two parts, which ſtand open, and bend backwards.

Theſe plants have properly no pericarpium, though in ſome few ſpecies there is a coriaceous cruſt placed about the ſeed. The ſeed is ſingle and oblong, often of a quadrangular figure, and ſometimes narrower at the baſe than in any other part. However, in different gene-

ra of this clafs, they are of a very different appearance at the ends. Some are crowned with a downy matter, compofed of a great number of fingle fhort filaments, placed circularly, or otherwife, on the head of the feed. In fome the downy matter is radiated; in others it is ramofe or branched; and in fome it is fupported on a pedicle, while in others it ftands immediately on the feed. In fome genera the feeds have no down at all, but have a fmall corona, formed of what was originally the cup of the flower. This is permanent, and divided ufually into five fegments. In fome genera the feed is wholly naked, having neither any down nor this crown of a cup.

SYNGNATHUS, in ichthyology, a genus of the malacopterigious clafs of fifhes, the body of which is long and very flender; fometimes it is rounded, but in moft of the fpecies it is angulated; the fins are in fome fpecies four, but in others there is only one; the head is of an oblong figure, and compreffed; the jaws are clofed together at the fides, and the mouth has only a fmall opening, which is quite at the extremity; the coverings of the gills are compofed each of only one fimple and very thin bony lamina.

This genus comprehends the fea-adder, or the rounded bodied fyngnathus, with no pectoral nor tail fins; the fyngnathus with the middle of the body heptangular, and a fin at the tail; the needle-fifh, being the fyngnathus with the middle of the body hexangular, and the tail pinnated; and the fea-horfe, or hippocampus. See the article HIPPOCAMPUS.

SYNNEUROSIS, in anatomy, a kind of articulation of the bones, performed by the intervention of ligaments. See the article ARTICULATION.

The fynneurofis is reckoned a branch of the fymphyfis, and is, when the bones are connected together by a ligament, as in the os femoris to the os ifchium, and the patella to the tibia. See the article SYMPHYSIS.

SYNOCHUS, or SYNOCHA, in medicine, a continual fever, without any remiffion. See the article FEVER.

This fpecies of fever, according to Hoffman, is the firft in the clafs of inflammatory fevers. It begins without any remarkable cold or fhivering, and is very violent at the firft onfet, and continues with little or no remiffion, of the fymptoms, till the time of the crifis; the pulfe is great and full. See the articles INFLAMMATION and INFLAMMATORY.

The difeafe generally infefts one part more than another; if the head, the face will fwell, the eyes look red and full of tears, the head will ach with an unufual pulfation of the temporal arteries, there will be a vertigo, a drowfinefs, an infenfibility, and a raving; if the heart and lungs, a thick difficult refpiration, anxiety, and palpitation of the heart, with lofs of ftrength, and a dejection of mind; if the oefophagus, thirft, a drynefs, and blacknefs of the tongue; if the ftomach, a naufea, and reaching to vomit, and fometimes hiccoughing; if the bowels, inflations, coftivenefs, or fetid ftools; if in the veffels of the mefaraic veins and arteries, a fixed pain about the vertebræ of the loins; if in the membranes of the fpinal marrow, a tumbling and toffing, a numbnefs and weaknefs of the joints, and now and then convulfions. It is fometimes putrid, or malignant, with fudden lofs of ftrength, and is not feldom attended with dufky or black fpots, which threaten immediate danger. This fever often terminates fpontaneoufly on the fourth, feventh or eleventh days, generally by a profufe fweat, or by a plentiful bleeding at the nofe; in the malignant kind, by a loofenefs.

When it is treated rightly, at the beginning, with bleeding, and with cooling and gentle diaphoretic medicines, it often ceafes on the fourth day; otherwife, according to Hoffman, it may continue till the fourteenth or feventeenth. Thofe to whom it turns fatal, generally die of the mortification of fome noble part. Bleeding in this difeafe is highly neceffary, and that not fparingly, if the patient's ftrength will bear it; then a cooling beverage, as the following: Take of fpring water, two pound; of rofe-water, and white-fugar, each an ounce; citron-juice, one ounce; or inftead thereof, fpirit of vitriol, twenty drops: of this mixture, let the patient take frequent draughts. The hartfhorn jelly, with fugar, citron juice, and rofe-water, are excellent in this cafe; as alfo, whey turned with citron-juice: abforbent diaphoretic powders, are likewife ufeful, and the body fhould be kept open with emollient clyfters.

SYNOD, in aftronomy, a conjunction, or concourfe of two or more ftars, or planets,

in

in the fame optical place of the heavens.

SYNOD, fignifies alfo a meeting, or affembly of ecclefiaftical perfons, concerning matters of religion; of thefe, there are four kinds, *viz.* 1. A general or univerfal fynod, where bifhops meet from all nations. 2. A national fynod, where thofe of one nation only meet. 3. A provincial fynod, where the clergy of one province affemble together. 4. A diocefan fynod, where thofe only of one diocefe affemble. See CONVOCATION.

SYNODALS, or SYNODIES, were pecuniary rents, commonly of two fhillings paid to the bifhop, or archdeacon, at the time of their Eafter vifitation, by every parifh prieft. They were thus called, becaufe ufually paid in fynods, for that antiently bifhops ufed to vifit and hold their diocefan fynods at once; for the fame reafon, they are fometimes denominated fynodalica, but more properly procurations.

SYNODALES TESTES, was an appellation antiently given to the urban and rural deans, from their informing againft, and attefting, the diforders of the clergy, and the people in the epifcopal fynods. When thefe funk in their authority, in their ftead arofe another fort of fynodal witneffes, who were a kind of impanelled jury, confifting of a prieft, and two or three laymen for every parifh; though at length two for every diocefe were annually chofen, till at laft the office came to be devolved on the church-wardens. See the article CHURCH WARDENS.

SYNODALE INSTRUMENTUM, a folemn oath, or engagement that thefe fynodal witneffes took, as our church-wardens now are fworn to make juft prefentments. See the preceding article.

SYNODICAL, fomething belonging to a fynod; thus fynodical epiftles are circular letters written by the fynods to the abfent prelates and churches, or even thofe general ones directed to all the faithful, to inform them of what had paffed in the fynod. For the fynodical month, fee the article MONTH.

SYNOECIA, in grecian antiquity, a feaft celebrated at Athens, in memory of Thefeus's having united all the petty communities of Attica into one fingle common-wealth, the feat whereof was Athens, where all the affemblies were to be held. This feaft was dedicated to Minerva, and according to the fcholiaft of Thucydides, it was held in the month Metagitnion.

SYNONYMOUS, is applied to a word or term that has the fame import or fignification with another.

SYNONYMISTS, among botanical writers, fuch as have employed their care in the collecting the different names or fynonyma, ufed by different authors, and reducing them to one another.

SYNONYMY, in rhetoric, a figure whereby fynonyms, or fynonymous terms, that is, various words of the fame fignification, are made ufe of to amplify the difcourfe.

SYNOVIA, or SYNONIA, in medicine, a term ufed by Paracelfus, and his fchool, for the nutricious juice, proper and peculiar to each part; thus they talk of the fynovia of the joints, of the brain, *&c.* The mucilaginous glands of the capfulæ ligamentæ, and the fheaths of the tendons, excrete a mucilaginous liquor called fynovia, the ufe of which is to keep the cartilages fupple, and confequently to facilitate the motion of the tendons and joints.

Others ufe fynovia for the gout, and other difeafes in the joints, arifing from a vice in the nutricious juice. Others reftrain the term to the oufing out of the juice through a wounded part, efpecially at a joint.

SYNTAGMA, συνταγμα, the difpofing or placing of things in an orderly manner.

SYNTAX, συνταξις, in grammar, the proper conftruction, or due difpofition of the words of a language, into fentences, or phrafes; or, as Buffier more accurately defines it, the manner of conftructing one word with another, with regard to the different terminations thereof, prefcribed by the rules of grammar. See CONSTRUCTION and SENTENCE.

Hence the office of fyntax is to confider the natural fuitablenefs of words with refpect to one another, in order to make them agree in gender, number, perfon, mood, *&c.* To offend in any of thefe points, is called, to offend againft fyntax; and fuch kind of offence, when grofs, is called a folecifm, and when more flight, a barbarifm. See GENDER, *&c.*

Syntax is generally divided into two parts, *viz.* concord, wherein the words are to agree in gender, number, cafe, and perfon; and regimen or government, wherein one word governs another, and occafions fome variations therein. See the articles CONCORD and REGIMEN.

SYNTEXIS, in medicine, an attenuation, or colliquation of the folids of the body, fuch

ſuch as frequently happens in atrophies, inflammations of the bowels, colliquative fevers, wherein a fatty and uligenous matter is voided with the excrements by ſtool. See COLLIQUATION, &c.

SYNTHESIS, the putting of ſeveral things together, as making a compound medicine of ſeveral ſimple ingredients, &c. See the article COMPOSITION.

SYNTHESIS, in logic, denotes a branch of method oppoſite to analyſis, called the ſynthetic method. See METHOD.

SYNTHESIS in grammar. See SYLLEPSIS.

SYNTHESIS in ſurgery, is an operation whereby divided parts are re-united, as in wounds, fractures, luxations, &c. See the article WOUND, &c.

SYNTHETIC, ſomething relating to ſyntheſis. See the preceding article.

SYNTHETIC, or SYNTHETICAL, is, according to Dr. Shaw, a term given to that part of chemiſtry, which, after the analytical chemiſtry has taken bodies to pieces, or reduced them to their principles, can, from theſe ſeparated principles, either recompound the ſame body again, or, from the mixtures of the principles of one or more bodies in various manners, form a large ſet of new productions, which would have been unknown to the world but for this art: ſuch productions are brandy, ſoap, glaſs, and the like. Synthetical chemiſtry, taken in the ſtrict ſenſe for the recompoſition of bodies from their own principles, is rather of philoſophical than of ordinary uſe. This, however, is not eaſy, except in a few caſes, nor are we to imagine, becauſe it has been done in ſome, that nature has taken this way to compoſe them; her method of compoſition of bodies are a new ſubject, and worthy a diligent enquiry.

SYNUSIASTS, a ſect of heretics, who maintained, that there was but one nature, and one ſingle ſubſtance in Jeſus Chriſt. The ſynuſiaſts denied, that the word aſſumed a body in the womb of the virgin, but held, that a part of the divine word being detached from the reſt, was there changed into fleſh and blood. Thus they taught, that Jeſus Chriſt was conſubſtantial to the father, not only as to his divinity, but even as to his humanity and very body.

SYPHON, or SIPHON. See SIPHON.

SYRACUSE, a city and port-town of Sicily, in the province of Val de Noto, ſituated on a fine bay of the Mediterranean Sea, on the eaſt coaſt of the iſland, in eaſt long. $15^{\circ}\ 5'$, north lat. $37^{\circ}\ 25'$.

SYREN, or SIREN, in antiquity. See the article SIREN.

SYRIA, a part of aſiatic Turky, bounded by Natolia and Turcomania, on the north; by Diarbec or Meſopotamia on the eaſt; by Arabia and Paleſtine on the ſouth; and by the Levant-Sea on the weſt. The Turks divide Syria into three beglerbeglies, or vice-royalties, viz. thoſe of Aleppo, Tripoli, and Damaſcus, or Scham, the ſeats of the reſpective viceroys.

SYRIAN YEAR, &c. See YEAR, &c.

SYRINGA, the PIPE TREE, in botany, a genus of the diandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle petal, the tube is cylindric, and very long, the limb is divided into four ſegments of a linear figure, hollow and obtuſely pointed; the fruit is an oblong compreſſed acuminated capſule, formed of two valves, and containing two cells. The ſeeds are ſingle, oblong, and compreſſed, pointed at each end, and furniſhed with a membranaceous margin. This genus comprehends the lilac of Tournefort.

The branches of this tree, when the pith is taken out, ſerve for pipes in ſyringes.

SYRINGA, is alſo a name for the plant, otherwiſe called philadelphus. See the article PHILADELPHUS.

SYRINGE, an inſtrument ſerving to imbibe, or ſuck in a quantity of any fluid, and to ſquirt or expel the ſame with violence.

The ſyringe is made of an hollow cylinder A B C D, plate CCLXVI. n° 1. furniſhed with a little tube at the bottom, E F. In this cylinder is an embolus K, made, or at leaſt covered with leather, or ſome other matter, that eaſily imbibes moiſture, and ſo filling the cavity of the cylinder, as that no air or water may paſs between the one and the other. If then the little end of the tube F, be put into water, and the embolus drawn up, the water will aſcend into the cavity left by the embolus, and upon thruſting back the embolus, it will be violently expelled again through the tube E F; and ſtill the greater impetus will the water be expelled withal, and to the greater diſtance, as the embolus is thruſt down with the greater force, or the greater velocity. See the article EMBOLUS.

This aſcent of the water, the antients, who ſuppoſed a plenum, attributed to nature's abhorrence of a vacuum; but

the moderns, from repeated experiments, have found it to be owing to the preſſure of the atmoſphere upon the fluid; for by drawing up the embolus, the air left in the cavity of the cylinder, will be exceedingly rarified, ſo that being no longer a counterbalance to the air, incumbent on the ſurface of the fluid, that prevails and forces the water through the little tube into the body of the ſyringe. See the article AIR, &c.

In effect, a ſyringe is only a ſingle pump, and the water aſcends in it on the ſame principle as in the common ſucking pump, whence it follows, that the water will not be raiſed in a ſyringe to any height exceeding thirty-one feet. See the articles PUMP and SUCTION.

Syringes are of conſiderable uſes in ſurgery; by them clyſters are adminiſtered, injections of medicinal waters, &c. made into wounds, &c. They alſo ſerve to inject coloured liquors, melted wax, &c. into the veſſels of the parts of animals, to ſhew the diſpoſition, texture, ramifications, &c. thereof. The moſt conſiderable ſyringes uſed in ſurgery, are theſe following, as repreſented, in plate *ibid.* where n° 2. is a ſyringe for various uſes, furniſhed with pipes of different ſorts. By the help of this you may not only inject fluids into wounds of the abdomen and thorax, into the fauces, into abſceſſes, ulcers, and to the uterus, but you may alſo, by the aſſiſtance of this inſtrument, draw extravaſated blood from the cavity of the thorax, in which caſe the ſyringe ſhould be twice as large as the mouth: the pipe ſhould be triangular, and about two thumbs breadth: n° 3. is another pipe, with a round mouth, intended for the ſame uſes: n° 4. a ſmaller pipe, which, as well as the reſt, may be ſcrewed on the ſyringe: n° 5. another pipe ſomewhat curved, and perforated on both ſides. This will ſerve to ſuck blood out of the cavity of the thorax, and throw injections into that part, or into the fauces: n° 6. another perforated at the end like a cullender: n° 7. another perforated like the former, but curved, to throw injections into the uterus, and for other uſes: n° 8. repreſents the ſyringe proper for injecting liquors into the urethra of males, and the vagina of females, for various uſes: it ends with an obtuſe point, to prevent the liquor from regurgitating, or flying about.

SYRINGOTOMY, in ſurgery, the operation of cutting for the fiſtula. See the article FISTULA.

SYRINGOTON, the name of an inſtrument to lay open the fiſtula.

SYRUP, or SYROP, in pharmacy, a ſaturated ſolution of ſugar, made in vegetable decoctions, or infuſions. See the article DECOCTION.

Theſe preparations were formerly conſidered as medicines of much greater importance than they are thought to be at preſent. Syrups and diſtilled waters were for ſome ages made uſe of as the great alteratives, inſomuch, that the evacuation of any peccant humour was never attempted, till, by a due courſe of theſe, it had firſt been regularly prepared for expulſion. Hence aroſe the exuberant collection of both, which we meet with in pharmacopœias; and like errors, have prevailed in each. As multitudes of diſtilled waters have been compounded from materials, unfit to give any virtue over the helm, ſo numbers of ſyrups have been prepared from ingredients which in their form cannot be taken in ſufficient doſes, to exert their virtues; for two thirds of a ſyrup conſiſt of ſugar, and the greateſt part of the remaining third is an aqueous fluid.

Syrups are at preſent regarded chiefly as convenient vehicles for medicines of greater efficacy, and made uſe of for ſweetening draughts and juleps, for reducing the lighter powders into boluſes, pills, or electuaries, and other like purpoſes; ſome likewiſe may not improperly be conſidered as medicines themſelves, as thoſe of ſaffron, or buckthorn-berries.

*General rules for preparing* SYRUPS. 1. All the rules for making decoctions, are likewiſe to be obſerved in making ſyrups; vegetables both for decoctions and infuſions ought to be dry, unleſs they are expreſsly ordered otherwiſe. 2. In the London Pharmacopœia, only the pureſt, or double refined ſugar, is allowed. In the Edinburgh, the leſs pure, or common white ſugar is employed, and farther purified by the operator. For ſuch ſyrups as are prepared without coction, the ſugar is previouſly diſſolved in water by itſelf, the ſolution clarified with whites of eggs, and boiled down to a thick conſiſtence, the ſcum which ariſes during the boiling being carefully taken off. In the ſyrups prepared by coction, the clarification with whites of eggs is performed after the ſugar has been diſſolved in

in the decoction of the vegetable, except in the syrup of meconium, for which therefore, the purest sugar is directed. The purification of sugar, by clarification, and despumation, is not so perfect as might be expected, for after it has undergone this process, the refiners still separate from it a quantity of oily matter, which is disagreeable to weak stomachs. See the articles CLARIFICATION and DESPUMATION.

The clarification of the sugar along with the vegetable decoction, is likewise injurious to the medicine, since by this means not only the impurities of the sugar are discharged, but a considerable part of what the liquor had before taken up from the other ingredients. It appears therefore most eligible to employ fine sugar for all the syrups, even the purgative ones (which have been usually made with coarse sugar, as somewhat coinciding with their intention) not excepted; for as purgative medicines are in general ungrateful to the stomach, it is certainly improper to employ an addition, which increases their offensiveness. 3. Where the weight of the sugar is not expressed, twenty-nine ounces thereof is to be taken to every pint of liquor. The sugar is to be reduced into powder, and dissolved in the liquor by the heat of a water-bath, unless ordered otherwise: although in the formulæ of the several syrups, a double weight of the sugar to that of the liquor is directed, yet less will generally be sufficient. First, therefore dissolve in the liquor an equal weight of sugar, then gradually add some more in powder till a little remains undissolved at the bottom, which is to be afterwards incorporated by setting the syrup in a water-bath. The quantity of sugar should be as much as the liquor is capable of keeping dissolved in the cold; if there is more, a part of it will separate and concrete into crystals, or candy; if less, the syrup will be subject to ferment, especially in warm weather, and change to a vinous or sour liquor. 4. Copper vessels, unless they are well tinned, should not be employed in the making of acid syrups, or such as are composed of the juices of fruits. The confectioners, who are the most dextrous people at these kinds of preparations, to avoid the expence of frequently new tinning their vessels, rarely make use of any other than copper ones untinned in the preparation even of the most acid syrups, such as that of oranges, lemons, and the like. Nevertheless, by taking due care that their coppers be well scoured and perfectly clean, and that the syrup remain no longer in them than is absolutely necessary, they avoid giving it any ill taste or quality from the metal. 5. The syrup, when made, is to be set by till next day: if any saccharine crust appears upon the surface, take it off.

SYSSARCOSIS, in anatomy, a particular species of the kind of articulation, called also symphysis. See the articles ARTICULATION and SYMPHYSIS.

The syssarcosis is a natural union of two bones by means of flesh or muscles, such is that of the os hyoides and omoplate.

Syssarcosis is also used by some chirurgical writers to express a method of curing wounds of the head when the cranium is laid bare, and the interstice between the lips of the wound too wide for a contraction, by means of promoting the granulation or growth of new flesh.

SYSTEM, *systema*, in general, denotes an assemblage or chain of principles and conclusions, or the whole of any doctrine, the several parts whereof are bound together and follow or depend on each other; in which sense we say, a system of philosophy, a system of divinity, *&c.*

SYSTEM, in astronomy, denotes an hypothesis or supposition of an arrangement of the several parts of the universe, whereby astronomers explain all the phænomena or appearances of the heavenly bodies, their motions, changes, *&c.* This is more properly called the systems of the world. System and hypothesis have much the same signification, unless perhaps hypothesis be a more particular system, and system a more general hypothesis. See the article HYPOTHESIS.

The three most celebrated systems of the world are the copernican, the ptolemaic, and tychonic, the œconomy of each whereof may be seen under the articles COPERNICAN, PTOLEMAIC, and TYCHONIC.

SYSTEM, in poetry, denotes a certain hypothesis, or scheme of religion, from which the poet is never to recede: *e. gr.* having made his choice either in the heathen mythology or in christianity, he must keep the two apart, and never mix such different ideas in the same poem.

SYSTEM, in music, denotes a compound interval, or an interval composed, or conceived to be composed, of several less, such

ſuch as the octave. See INTERVAL. The word is borrowed from the antients, who call a ſimple interval, diaſtem; and a compound one, ſyſtem. See the article DIASTEM.

As there is not any interval in the nature of things, ſo we can only conceive any given interval as compoſed of, or equal to, the ſum of ſeveral others: this diviſion of intervals therefore only relates to practice, ſo that a ſyſtem is properly an interval which is actually divided in practice, and where along with the extremes we always conceive ſome intermediate terms. The nature of a ſyſtem will be very plain by conceiving it an interval whoſe terms are in practice taken either in immediate ſucceſſion, or the ſound is made to riſe or fall from one to the other, by touching ſome intermediate degrees, ſo that the whole is a ſyſtem or compoſition of all the intervals between one extreme and another. Syſtems of the ſame magnitude, and conſequently of the ſame degree of concord and diſcord, may yet differ in reſpect of their compoſition, as containing, and being actually divided into more or fewer intervals; and when they are equal in that reſpect, the parts may differ in magnitude. Laſtly, when they conſiſt of the ſame parts or leſſer intervals, they may differ as to the order and diſpoſition thereof between the two extremes.

There are ſeveral diſtinctions of ſyſtems, the moſt remarkable of which are concinnous or inconcinnous. Concinnous ſyſtems are thoſe which conſiſt of ſuch parts as are fit for muſic, and thoſe parts placed in ſuch an order between the extremes, as that the ſucceſſion of ſounds from one extreme to the other, may have a good effect. See CONCINNOUS.

The concinnous ſyſtems, according to Euclid, are diateſſaron, diapente, diapaſon; diapaſon and diateſſaron, diapaſon and diapente, and biſdiapaſon. See DIATESSARON, DIAPENTE, &c.

Inconcinnous ſyſtems are thoſe wherein the ſimple intervals are inconcinnous, or badly diſpoſed between the two extremes. The inconcinnous, that author obſerves, are leſs than the fourth, and all thoſe ſituated between the above-mentioned ones.

A ſyſtem is either particular or univerſal. An univerſal ſyſtem is that which contains all the particular ſyſtems belonging to muſic, and makes what the antients call diagram, and we, the ſcale of muſic. See DIAGRAM, SCALE, GAMUT, &c.

The antients alſo diſtinguiſh ſyſtems into perfect and imperfect. The biſdiapaſon, or double octave, was reckoned a perfect ſyſtem, becauſe, within its extremes are contained examples of all the ſimple and original concords, and all the variety of orders wherein their concinnous parts ought to be taken, which variety conſtitutes what they call ſpecies or figures of conſonances. All the ſyſtems leſs than the biſdiapaſon were reckoned imperfect. The double octave was called ſyſtema maximum and immutatum, becauſe they took it to be the greateſt extent or difference of time they could go in making melody, though ſome added a fifth to it for the greateſt ſyſtem: but the diapaſon, or ſimple octave, was reckoned the moſt perfect ſyſtem with regard to the agreement of its extremes, ſo that how many octaves ſoever were put into the greateſt ſyſtem, they were all to be conſtituted or ſubdivided the ſame way as the firſt; ſo that when we know how the octave is divided, we know the nature of the diagram or ſcale, the varieties whereof conſtitute the genera melodiæ, which are ſubdivided into ſpecies. See the articles GENUS and SPECIES.

SYSTEMATISTS, in botany, thoſe authors whoſe works in this ſcience are principally employed about the arranging plants into certain orders, claſſes, or genera.

SYSTOLE, in anatomy, the contraction of the heart, whereby the blood is drawn out of its ventricles into the arteries; the oppoſite ſtate to which is called the diaſtole, or dilatation of the heart. See the articles HEART, BLOOD, DIASTOLE, PULSE, &c.

The ſyſtole of the heart is well accounted for by Dr. Lower, who ſhews that the heart is a true muſcle, the fibres whereof are acted on like thoſe of other muſcles, by certain branches of the eight pair of nerves inſerted into it, which bring the animal ſpirits from the brain hither. By a flux of theſe ſpirits the muſcular fibres of the heart are inflated and thus ſhortened, the length of the heart diminiſhed, its breadth or thickneſs increaſed, the capacity of the ventricles cloſed, the tendinous mouths of the arteries dilated, thoſe of the veins ſhut up by means of their valves, and the contained juice forcibly expreſſed in the orifices of the arteries. See the article MUSCLE, &c.

Dr. Drake adds to Dr. Lower's account, that the intercostal muscles and diaphragm contribute to the systole, by opening the blood a passage from the right ventricle of the heart to the left, through the lungs, to which it could not otherwise pass, because the opposition the blood contained in that ventricle must necessarily have made to its constriction, is taken off. Both these authors make the systole the natural state, or action of the heart, and the diastole the violent one. Boerhaave, on the contrary, makes the systole the violent, and the diastole the natural state. See the articles CIRCULATION, CONTRACTION, ARTERY, &c.

SYSTYLE, in architecture, that manner of placing columns where the space between the two fusts consist of two diameters, or four modules. See the articles COLUMN, DIAMETER, and MODULE.

SYZYGY, *syzygia*, in astronomy, a term equally used for the conjunction and opposition of a planet with the sun. See CONJUNCTION and OPPOSITION.

On the phænomena and circumstances of the syzygies a great part of the lunar theory depends. See the article MOON.

For, 1. It is shewn in the physical astronomy, that the force which diminishes the gravity of the moon in the syzygies, is double that which increases it in the quadratures: so that in the syzygies the gravity of the moon from the action of the sun is diminished by a part which is to the whole gravity as 1 to 89,36: for in the quadratures, the addition of gravity is to the whole gravity as 1 to 178,73. See the article QUADRATURE.

2. In the syzygies, the disturbing force is directly the distance of the moon from the earth, and inversely as the cube of the distance of the earth from the sun. And at the syzygies the gravity of the moon towards the earth receding from its center is more diminished, than according to the inverse ratio of the square of the distance from that center. Hence, in the motion of the moon from the syzygies to the quadratures, the gravity of the moon towards the earth is continually increased, and the moon is continually retarded in its motion; and in the motion from the quadratures to the syzygies the moon's gravity is continually diminished, and its motion in its orbit accelerated. See the article GRAVITATION.

3. Further in the syzygies the moon's orbit, or circle, round the earth, is more convex than in the quadratures, for which reason the moon is less distant from the earth at the former than the latter. When the moon is in the syzygies, her apsides go backwards, or are retrograde. See the articles ORBIT, APSIS, and RETROGRADATION.

When the moon is in the syzygies, the nodes move in antecedentia fastest: then slower and slower, till they become at rest, when the moon is in the quadratures. See the article NODE.

Lastly, When the nodes are come to the syzygies, the inclination of the plane of the orbit is least of all. See the article INCLINATION.

Add that these several irregularities are not equal in each syzygy, but all somewhat greater in the conjunction than in the opposition.

# T.

T, or t, the nineteenth letter, and fifteenth consonant of our alphabet, the sound whereof is formed by a strong expulsion of the breath through the mouth, upon a sudden drawing back of the tongue from the fore part of the palate, with the lips at the same time open. The proper sound of this letter is that in *tan, ten, tin, tun, fat, pot, put*, &c. When it comes before *i*, followed by a vowel, it is sounded like *s*, as in *nation, potion*, &c. When *h* comes after it, it has a twofold sound; one clear and acute, as in *thin, thief*, &c. the other more obtuse and obscure, as in *then, there*, &c.

In abbreviations, amongst the roman writers, T. stands for Titus, Titius, &c. Tab. for Tabularius; Tab. P.H.C. Tabularius provinciæ Hispaniæ citerioris; Tar. Tarquinius; Ti. Tiberius; Ti. F. Tiberii filius; Ti. L. Tiberii libertus; Ti. N. Tiberii Nepos; T. J. A. V. P. V. D. tempore judicem arbitrumve postulat ut det; T M. P. terminum posuit; T M. DD. terminum dedicavit;

Tr,

Tr. trans, tribunus; Tr. M. or Mil. tribunus militum; TR. PL. DES. tribunus plebis designatus; TR. AER. tribunus ærarii; TRV. CAP. triumviri capitales; T. P. or TRIB. POT. tribunicia potestate; Tul. H. Tullus Hostilius.

Amongst the antients, T. as a numeral, stood for one hundred and sixty; and with a dash at top, thus T̄, it signified one hundred and sixty thousand. In music, T stands for tutti, all, or altogether.

TABAGO, one of the Caribbee-islands in the American-ocean, one hundred and twenty miles south of Barbadoes: west longitude 59°, north latitude 11° 30′.

It is from this place that tabacco, or tobacco, a well known plant, takes its name. See the article TOBACCO.

TABARCA, an island on the coast of Barbary, in Africa, fifty miles west of Tunis: east long. 8°, north lat. 36° 30′.

TABASCO, the capital of a province of the same name, situated on the bay of Campeachy, at the mouth of the river Tabasco, one hundred and sixty miles south-west of Campeachy: west long. 95°, north lat. 18°.

TABBY, in commerce, a kind of rich silk which has undergone the operation of tabbying. See the next article.

TABBYING, the passing a silk or stuff under a calender, the rolls of which are made of iron or copper, variously engraven, which bearing unequally on the stuff renders the surface thereof unequal, so as to reflect the rays of light differently, making the representation of waves thereon.

TABELLA, TABLET, in pharmacy, is much the same with troches and lozenges, being a solid preparation formed into a little cake, or mass, of different figures, intended to dissolve slowly, and generally made agreeable to the palate. This form is mostly made use of for the more commodious exhibition of certain medicines, by fitting them to dissolve slowly in the mouth, so as to pass by degrees into the stomach, and hence these preparations have generally a considerable proportion of sugar or other such materials. They are calculated for children who are not easily prevailed on to take medicines in less agreeable forms. There are various kinds of them, as the tabellæ antacidæ, tabellæ anthelminticæ, tabellæ purgantes, &c. See TROCHE.

TABELLIO, in the roman law, an officer or scrivener, much the same with our notaries public, who are often called tabelliones in our antient law books. See the article NOTARY.

TABERNACLE, among the Hebrews, a kind of building, in the form of a tent, set up, by express command of God, for the performance of religious worship, sacrifices, &c. during the journeying of the Israelites in the wilderness; and, after their settlement in the land of Canaan, made use of for the same purpose till the building of the temple of Jerusalem. It was divided into two parts, the one covered, and properly called the tabernacle; and the other open, called the court. The curtains which covered the tabernacle were made of linen, of several colours, embroidered. There were ten curtains, twenty-eight cubits long and four in breadth. Five curtains fastened together made up two coverings, which covered all the tabernacle. Over these there were two other coverings; the one of goat-hair, and the other of sheep-skins. The holy of holies was parted from the rest of the tabernacle by a curtain made fast to four pillars, standing ten cubits from the end. The length of the whole tabernacle was thirty-two cubits, that is, about fifty feet; and the breadth twelve cubits, or nineteen feet. The court was a spot of ground one hundred cubits long, and fifty in breadth, enclosed by twenty columns, each twenty cubits high and ten in breadth, covered with silver, and standing on copper bases, five cubits distant from one another; between which, there were curtains drawn, and fastened with hooks. At the east end was an entrance, twenty cubits wide, covered with a curtain hanging loose.

*Feast of* TABERNACLES, a solemn festival of the Hebrews, observed after harvest, on the fifteenth day of the month Tisri, instituted to commemorate the goodness of God, who protected the Israelites in the wilderness, and made them dwell in booths, when they came out of Egypt. On the first day of the feast, they began to erect booths of the boughs of trees, and in these they were obliged to continue seven days. The booths were placed in the open air, and were not to be covered with cloths, nor made too close by the thickness of the boughs; but so loose that the sun and the stars might be seen, and the rain descend through them. For further particulars, as to the celebration of this festival, see Levit. chap. xxiii.

TABERNÆMONTANA, in botany, a genus of the pentandria-monogynia clafs of plants, the corolla whereof confifts of a fingle infundibuliform petal: the tube is cylindric and long: the bafe and apex are both ventricofe: the limb is divided into five linear obtufe fegments; the fruit is compofed of two follicles bent horizontally, ventricofe, and acuminated, formed of one valve, and containing one cell: the feeds are numerous, of an oblong oval figure, obtufe, imbricated, and wrapped up in pulp.

TABES DORSALIS, in medicine, a diftemper which, according to a late author, is a particular fpecies of a confumption, the proximate caufe of which is a debility of the nerves. See the article CONSUMPTION.

Of the feveral kinds of confumptions incident to human bodies, the tabes dorfalis is the floweft in its progrefs, but the moft melancholy in its circumftances; and, unlefs timely obviated, for the moft part fatal. This difeafe is only incident to young men of falacious difpofitions, and proceeds from too early venery, an immoderate ufe of it, or pollutions. It feems therefore to derive its origin from too frequent venereal fpafms; and the immoderate lofs of feminal fluid has a confiderable fhare in producing the effect. The fymptoms of the tabes dorfalis are involuntary, nocturnal, feminal emiffions, a pain in the back, and often in the head, a formication of the fpine, an aching pain, rolling and hanging down of the tefticles, a weaknefs of memory and fight, and a mucous difcharge from the urethra, efpecially after ftraining at the difcharge of the excrements. The mucous difcharge here mentioned is called, by Hippocrates, liquidum femen, but it is nothing but the mucus of the proftrate gland. This difeafe is farther attended with great melancholy and dejection of mind, and a gutta ferena often follows. The eyes grow hollow, the vifage meagre and thin, the body emaciated and weak, a palpitation of the heart, and fhortnefs of breath, fucceed with a concourfe of hectical complaints, ending in death.

For the cure of this diftemper a regularity of the non-naturals is of the utmoft importance. Good air, rather cool than hot, is of great ufe. As to diet, high-feafoned meats, fpirituous and fermented liquors, fhould be avoided. No food is fo beneficial as milk: chocolate is alfo efteemed good, in fuch quantities as to fit eafy on the ftomach. Animal food of eafy digeftion, at dinner, does no harm. Suppers fhould be avoided, at leaft milk only fhould be then taken, about two hours before going to bed. Sleep muft be little, and in due feafon; that is, the patient fhould go to bed and rife early. Indulgence in bed in a morning is hurtful. The general rule fhould be to rife immediately upon waking; which, though irkfome at firft, will by cuftom be made familiar and agreeable. Moderate exercife, or fuch as the patient's ftrength will admit of without wearinefs, ought to be ufed. Some recommend riding, efpecially a long journey, by fuch daily portions as to avoid extraordinary fatigue. The fecretions of the body, if out of order, fhould be regulated, and the patient fhould be entertained with chearful company. As to the medicines, the claffes of balfamics and aftringents are chiefly ufeful. Among the latter, the peruvian bark, either in fubftance, extract, or tincture, the acid elixir of vitriol, and the tincture faturnia, or antiphthyfica, are the moft efficacious. Strengthening plafters may alfo be laid on the loins; and, chief of all, the cold bath fhould be ufed.

TABLATURE, in anatomy, a divifion, or parting, of the fkull into two tables. See the article SKULL.

TABLATURE, *tablatura*, in mufic, is, in general, when, to exprefs the founds or notes of a compofition, we ufe the letters of the alphabet, or any other characters not ufed in the modern mufic.

But, in a ftricter fenfe, tablature is the manner of writing a piece for the lute, theorba, guittar, viol, or the like, which is done by writing on feveral parallel lines, (each of which reprefents a ftring of the inftrument) certain letters of the alphabet, whereof A marks that the ftring is to be ftruck open, that is, without putting the finger of the left hand upon the neck; B fhews that one of the fingers is to be put on the firft ftop, C on the fecond, D on the third, and fo on through the octave. The tablature of the lute is ufually wrote in letters of the alphabet, and that of the harpficord in the common notes.

TABLE, *tabula*, a moveable piece of furniture, ufually made of wood or ftone, and fupported on pillars, or the like, for the

the commodious reception of things placed thereon.

TABLE, in architecture, a smooth simple member, or ornament, of various forms, but most usually in that of a long square. A projecting table is that which stands out from the naked of the wall, pedestal, or other matter it adorns. Raked-table, is that which is hollow in the die of a pedestal, or elsewhere, and is usually encompassed with a moulding. Razed-table, is an embossment in a frontispiece for the putting an inscription, or other ornament, in sculpture. This is what M. Perrault understands by abacus in Vitruvius. Crowned-table, that which is covered with a corniche, and in which a basso relievo is cut, or a piece of black marble incrustated for an inscription. Rusticated-table, that which is picked, and whose surface seems rough, as in grottos, *&c.*

TABLE, in perspective, denotes a plain surface, supposed to be transparent, and perpendicular to the horizon. It is always imagined to be placed at a certain distance between the eye and the objects, for the objects to be represented thereon by means of the visual rays passing from every point thereof through the table to the eye; whence it is called perspective-plane.

TABLE, in anatomy. The cranium is said to be composed of two tables, or laminæ, *i. e.* it is double, as if it consisted of two bones laid over one another. See the article SKULL.

TABLE *of Pythagoras*, or *Multiplication*-TABLE. See MULTIPLICATION.

*Laws of the twelve* TABLES, were the first set of laws of the Romans, thus called either by reason the Romans then wrote with a style on thin wooden tablets covered with wax, or rather, because they were engraven on tables, or plates of copper, to be exposed in the most noted part of the public forum. After the expulsion of the kings, as the Romans were then without any fixed or certain system of law, at least had none ample enough to take in the various cases that might fall between particular persons, it was resolved to adopt the best and wisest laws of the Greeks. One Hermodorus was first appointed to translate them, and the decemviri afterwards compiled and reduced them into ten tables. After a world of care and application, they were at length enacted and confirmed by the senate and an assembly of the people, in the year of Rome 303. The following year they found something wanting therein, which they supplied from the laws of the former kings of Rome, and from certain customs which long use had authorised: all these being engraven on two other tables made the laws of the twelve tables, so famous in the roman jurisprudence, the source and foundation of the civil or roman law.

TABLES *of the law*, in jewish antiquity, two tables on which were written the decalogue, or ten commandments, given by God to Moses on Mount Sinai. See the article DECALOGUE.

Many questions have been started about these tables, as concerning their matter, form, number, author, and contents. Some suppose them to have been made of wood, others of precious stone. These again are divided; some supposing them to have been of ruby, and others of carbuncle. Some oriental authors pretend they were ten in number, and others seven, but the Hebrews acknowledge no more than two. Moses observes, that these tables were written on both sides: many think they were transparent, so that they might be read through: others are of opinion that the same ten commandments were written on each of the two tables: and others, that the ten were divided, five being written on one table and five on the other. Moses expressly says that these tables were written by the hand of God. Some understand this literally, others ascribe it to the ministry of an angel, and others explain it by an order of God to Moses himself, to write them. The Mahometans say that God commanded the archangel Gabriel to make use of the pen, which is the invocation of the name of God, and of the ink which is taken out of the river of light, and therewith to write the tables of the law. When Moses brought these tables down from the mount, and saw the idolatry into which the children of Israel had fallen, he dropt them out of his hand, and by the fall they were broken to pieces; but this loss was repaired by the second table which God gave to Moses, and in which he commanded him to write down the words of the covenant which he had made with Israel. From hence some conclude that these latter tables were not written by the hand of God, though the first were. But Moses takes express notice that God himself wrote them; whence it follows either

ther that they were both written by the finger of God, or that neither of them was so written.

*New* TABLES, *tabulæ novæ*, an edict occasionally published in the roman commonwealth, for the abolishing all kinds of debts and annulling all obligations.

TABLE, among the jewellers. A table-diamond, or other precious stone, is that whose upper surface is quite flat, and only the sides cut in angles; in which sense a diamond, cut table-wise, is used in opposition to a rose-diamond. See the article DIAMOND.

TABLE-GLASS. See the article GLASS.

TABLE is also used for an index or repertory put at the beginning or end of a book, to direct the reader to any passage he may have occasion for: thus we say table of matters, table of authors quoted, &c. Tables of the Bible are called concordances. See CONCORDANCE.

TABLE *of houses*, among astrologers, certain tables ready drawn up for the assistance of practitioners in that art, for the erecting or drawing of figures or schemes. See the article HOUSE.

TABLE, in mathematics, system of numbers calculated to be ready at hand for the expediting astronomical, geometrical and other operations: thus we say tables of the stars; tables of sines, tangents, and secants; tables of logarithms, rhumbs, &c. sexagenary tables; loxodromic tables, &c. See the articles CANON, CATALOGUE, LOGARITHMS, RHUMB, SEXAGENARY, &c.

*Astronomical* TABLES, are computations of the motions, places, and other phænomena of the planets, both primary and secondary.

The oldest astronomical tables are those of Ptolemy, found in his Almagest; but these now agree no longer with the heavens. In 1252, Alphonso XI. king of Castile, undertook the correcting them, whence arose the alphonsine tables: but the deficiency of these was soon perceived by Regiomontanus and Purbachius; upon which the former of these, and after him Waltherus, and Warnerus, applied themselves for the further amending them: but died before they finished them. Copernicus calculated tables from his own observations and theories, from which Erasmus Reinholdus afterwards compiled the prutenic tables. From Tycho's theories, Longomontanus calculated tables, now called the Danish Tables: and Kepler likewise, from the same, in 1627, published the Rudolphine Tables, which are now much esteemed. These were afterwards, in 1650, turned into another form by Maria Cunitia, whose astronomical tables, comprehending the effect of Kepler's Physical Hypothesis, are exceedingly easy, and satisfy all the phænomena without any trouble of calculation, or any mention of logarithms, so that the Rudolphine calculus is hereby greatly improved. Other tables are the philolaic tables of Bullialdus; the britannic tables of Vincent Wing, calculated on Bullialdus's hypothesis; the britannic tables of John Newton; the french ones of count de Pagan; the caroline tables of Street, all calculated on Dr. Ward's hypothesis; and the novalmagestic tables of Ricciolus. Amongst these last, the philolaic and caroline tables are esteemed the best. Among the latest tables are the ludovician, published in 1702, by M. de la Hire, wholly from his own observations, and without the assistance of any hypothesis; those of Cassini in 1738; and Dr. Halley laboured to perfect another set of tables.

TABLE, in heraldry. Coats, or escutcheons containing nothing but the mere colour of the field, and not charged with any bearing or moveable, are called *tables d'attente*, tables of expectation, or *tabulæ rasæ*.

TABLET, *tabella*, in pharmacy. See the article TABELLA.

TABLING *of fines*, the making a table for every county, where his majesty's writs run, containing the contents of every fine passed each term. This is to be done by the chirographer of fines of the court of common pleas, whose duty it is every day of the next term, after the ingrossing of any such fine, to fix these tables in some open place of the said court, during the time of its sitting; and he is likewise to deliver to the sheriff of every county, his under-sheriff, or deputy, fairly wrote in parchment, a perfect copy of the table so made for that county, in the term next after the assizes, to be set up in an open place of that court, and to continue there so long as the justices shall sit, and in case either the sheriff, or chirographer, fails herein, he is liable to 5 l. penalty.

TABOR, *tabourin*, a small drum. See the article DRUM.

TABORITES, or THABORITES, a branch or sect of the antient Hussites. They

carried the point of reformation farther than Hufs had done, rejected purgatory, auricular confeffion, the unction of baptifm, tranfubftantiation, &c. They reduced the feven facraments of the Romanifts to four, *viz.* baptifm, the eucharift, marriage, and ordination.

TABRISTAN, a province of Perfia, fituated on the northern fhore of the cafpian fea, having the province of Aftrabat on the eaft, and Gilan on the weft; being part of the antient Hyrcania.

TACAMAHACA, in pharmacy, a folid refin, improperly called a gum, in the fhops: it is of a fragrant and peculiar fmell, and is of two kinds; the one called the fhell-tacamahaca, which is the fineft; the other, which is an inferior kind, being termed rough-tacamahaca, or tacamahaca in grains.

The fhell-tacamahaca is a concreted refin, of a fatty appearance, and fomewhat foft, fo as eafily to receive an impreffion from the finger; at leaft this is its ftate, when tolerably frefh. In time it grows hard and friable as common refin; but it is then to be rejected, as having loft much of its virtue. It is of a pale, brownifh, white colour, fometimes with a yellowifh, fometimes with a greenifh caft. It is moderately heavy, very inflammable, and of a very fragrant fmell of a peculiar kind, in which fomething like the aromatic fcent of lavender, and the perfume of amber-greafe, may be diftinguifhed, as mixed with a refinous flavour. Its tafte is very aromatic and agreeable, though very acrid.

The common or grain-tacamahaca, called alfo coarfe tacamahaca, by way of diftinction from the former fine kind, which is called tacamahaca fublimis by fome, is a dry, but fomewhat fattifh refin, fent over to us either in loofe granules, or in maffes formed of fuch. It is of a whitifh colour variegated with yellowifh, reddifh, or greenifh fpots. Some of the granules are fimply of one or other of thefe colours; others are variegated with two or more of them. It is of a fragrant fmell, refembling that of the fhell-tacamahaca, but lefs perfumed, and is of an acrid, aromatic, bitterifh tafte.

Tacamahaca is the gum of a tall tree, in the manner of its growth much refembling the poplar; its leaves are broad and ferrated at the edges, and terminate in a fharp point: the flowers have not been yet defcribed, but it is faid to be fmall and roundifh, containing a kernel not unlike that of a peach-ftone.

Some greatly commend tacamahaca in diforders of the breaft and lungs; but, at prefent it is very rarely ufed internally. Externally, however, it is in repute for foftening tumours, and mitigating pain and aches. Applied to the navel, it is faid to relieve women in hyfteric complaints; and applied in the fame manner to the region of the ftomach, it affifts digeftion, and expels flatufes: it is alfo an ingredient in fome of the fhop-compofitions.

TACHYGRAPHY, ταχυγραφια, the art of writing faft, or of fhort-hand; of which authors have invented feveral methods. See Brachygraphy.

TACK, in a fhip, a great rope having a wale-knot at one end, which is feized or faftened into the clew of the fail; fo is reefed firft though the cheffe-trees, and then is brought through a hole in the fhip's fide. Its ufe is to carry forward the clew of the fail, and to make it ftand clofe by a wind: and whenever the fails are thus trimmed, the main-tack, the fore-tack, and mizen-tack, are brought clofe by the board, and haled as much forward on as they can be.

The bowlings alfo are fo on the weather-fide; the lee-fheets are haled clofe aft, and the lee-braces of all the fails are likewife braced aft. Hence they fay, a fhip fails or ftands clofe upon a tack, *i. e.* clofe by the wind. The words of command are, hale aboard the tacks, *i. e.* bring the tack down clofe to the cheffe-trees. Eafe the tack, *i. e.* flacken it, or let it go, or run out. Let rife the tack, *i. e.* let all go out.

The tacks of a fhip are ufually belayed to the bitts, or elfe there is a chevil on purpofe to faften them.

Tack-about, in the fea-language, is to turn the fhip about, or bring her head about, fo as to lie the contrary way.

TACKLE, or Tackling, among feamen, denotes all the ropes or cordage of a fhip, ufed in managing the fails, &c.

In a more reftrained fenfe, tackles are fmall ropes running in three parts, having at one end a pendant and a block; and at the other end, a block and hook, to hang goods upon that are to be heaved into the fhip or out of it. See Ship.

TACTICS, in the art of war, is the method of difpofing forces to the beft advantage in order of battle, and of performing

forming the ſeveral military motions and evolutions.

TADCASTER, a market-town of Yorkſhire, ten miles ſouth-weſt of York.

TADMOR, the ſame with Palmyra. See the article PALMYRA.

TADORNA, in ornithology, a beautiful ſpecies of anas, nearly equal to the gooſe in ſize, and variegated with white, and with a longitudinal ſpot of grey on the belly: it is frequent on the coaſts of Wales and Lancaſhire.

TADPOLE, a young frog, before it has diſengaged itſelf from the membranes that envelope it in its firſt ſtage of life. See the article FROG.

TÆNIA, the TAPE-WORM, in zoology, a genus of worms, the body of which is of an oblong form, and compoſed of evident joints or articulations, in the manner of the links of a chain, or beads of a necklace.

The tape-worm grows frequently to ſeveral ells in length, and its articulations are a third of an inch long each. There is alſo another ſmall ſpecies, which never exceeds two inches in length, and is commonly not more than half an inch.

TÆNIA, in architecture, a member of the doric capital, reſembling a ſquare fillet, or reglet: it ſerves inſtead of a cymatium. See CYMATIUM.

TAFALA, a town of Navarre, in Spain, twenty-two miles ſouth of Pampeluna: weſt long. 1° 40′, north lat. 42° 45′.

TAFFAREL, or TAFFEREL, in a ſhip, the uppermoſt rail or frame, abaft over the poop. See the article SHIP.

TAFFETY, in commerce, a fine ſmooth ſilken ſtuff, remarkably gloſſy. See SILK.

There are taffeties of all colours, ſome plain, and others ſtriped with gold, ſilver, &c. others chequered, others flowered, &c. according to the fancy of the workmen.

TAFILET, a town of Biledulgerid, in Africa, ſituated three hundred miles ſouth-eaſt of Morocco: weſt long. 5°, north lat. 28°.

TAGETES, *French* MARYGOLD, or *African* MARYGOLD, in botany, a genus of the ſyngeneſia-polygamia ſuperflua claſs of plants, with a compound radiated flower, made up of numerous tubuloſe and ſemiquinquifid hermaphrodite corollulæ on the diſc, and ſeveral ligulated female flowers in the radius or verge: there is a ſingle ſeed ſucceeds each hermaphrodite corollula; all which are contained in the cup, which cloſes for that purpoſe. See plate CCLXVIII. fig. 1.

TAGUS, the largeſt river of Spain, which, taking its riſe on the confines of Arragon, runs ſouth-weſt through the provinces of New Caſtile and Eſtremadura; and paſſing by the cities of Aranjuez, Toledo, and Alcantara, and then croſſing Portugal, forms the harbour of Liſbon, at which city it is about three miles over; and about 8 or 10 miles below this, it falls into the Atlantic ocean.

TAJACU, the MUSK-HOG, in zoology, a ſpecies of hog, with a cyſt on the back, and no tail: it is a native of Mexico, and is ſmaller than the common hog. On the middle of the head there ariſes a kind of creſt, compoſed of a large cluſter of briſtles; and on the middle of the back there is a kind of cyſt or gland, with an opening at the upper part, in which is ſecreted a perfumed fluid matter, of a mixt ſmell between that of muſk and civet; whence the engliſh name.

TAIL, *cauda*, the train of a beaſt, bird, or fiſh; which, in land animals, ſerves to drive away flies, &c. and in birds and fiſhes, to direct their courſe, and aſſiſt them in aſcending or deſcending in the air or water. See the articles QUADRUPED, BIRD, FISH, &c.

TAIL *of a comet*, denotes the luminous rays iſſuing from a comet towards that part of the heavens, from whence it ſeems to move. See the article COMET.

TAIL *of the trenches*, in the art of war, is the poſt or place, where the beſiegers begin to break ground. See TRENCHES.

*Dragon's* TAIL, in aſtronomy, the deſcending node of a planet. See NODE.

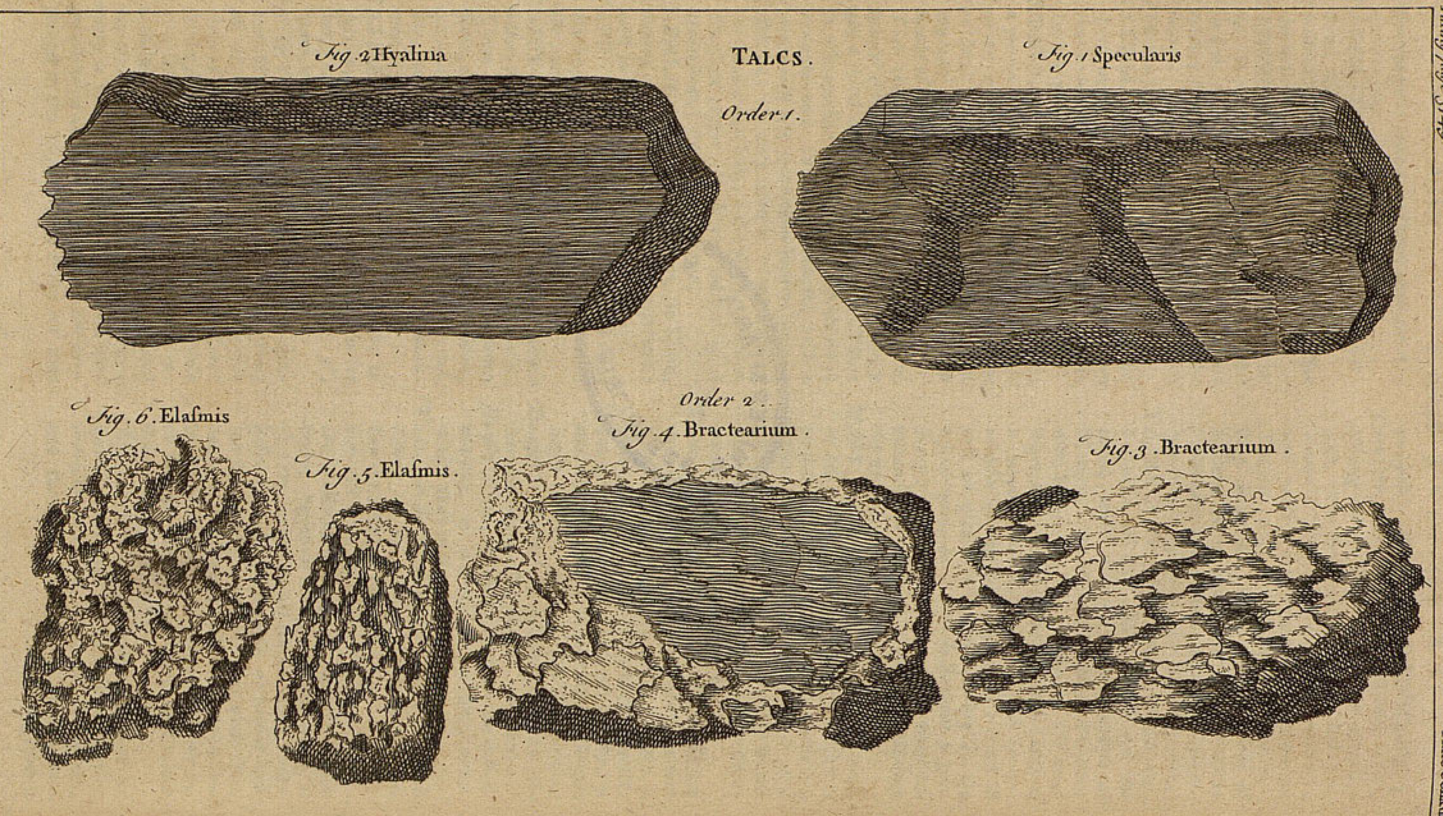
*Horſe's* TAIL, in the cuſtoms of the eaſtern nations, is the enſign, or flag, under which they make war.

TAIL, or FEE-TAIL, in law, is a limited eſtate, or fee; oppoſed to fee-ſimple. See the article FEE.

Fee-tail is an inheritance whereof a perſon is ſeiſed, to him and the heirs of his body, begotten or to be begotten; ſo that the tenant in tail cannot alien, either before or after iſſue had, or forfeit ſuch lands, longer than for his own life: becauſe an eſtate in tail always remains to the iſſue of the donee and his heirs; or in caſe he has no iſſue, then to the donor and his heirs.

Eſtates-tail of lands are either general or ſpecial. General tail is where lands or tenements are given to a man, or woman, and the heirs of either of their bodies begotten;


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*Fig. 1.* TAGETES.

*Fig. 2.* TANGENT.

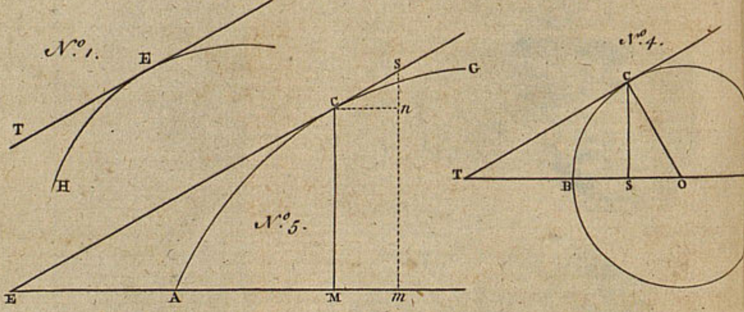



*Fig. 3.* TANACETUM the TANZY.






begotten; which is called a general tail, becaufe, however many wives a perfon that holds by this title fhall have one after another in lawful marriage, his iffue by them feverally are all capable of inheriting in their turns: and if the woman has iffue by feveral hufbands, they may all inherit after each other, as heirs of her body. A tail-fpecial, on the other hand, is when lands, &c. are limited to a man and his wife, and the heirs of their two bodies begotten, fo that the children by a fecond wife, or former wife, ftand abfolutely excluded.

Where lands are granted to a man and his heirs-male, or heirs female of his body begotten, fuch male or female iffue fhall only inherit purfuant to the limitation: and hence it is, that where a grant is to a man and the heirs-male of his body begotten, and he has iffue a daughter, who has a fon, this fon cannot inherit the eftate, becaufe he cannot prove his defcent by heirs-male.

Where lands, &c. are given to a hufband and wife, and the heirs of their two bodies begotten in fpecial tail, and one of them dies without iffue had between them; in fuch cafe, the furvivor fhall hold the lands for life, as tenant in tail after poffibility of iffue extinct, as the lawyers call it.

Neverthelefs, as great mifchiefs were occafioned by inheritances being intailed; as defrauding of creditors, &c. difobedience of fons, when they knew they could not be difinherited, and the like, the judges found out a way to bar an intailed eftate with remainders over, by a feigned recovery. See RECOVERY.

TAILLEBOURG, a town of Guienne, in France, thirty miles fouth-eaft of Rochelle.

TALLOIR, in architecture, a term fometimes ufed for abacus. See ABACUS.

TAINE, a port-town of Rofs-fhire, in Scotland, fituated on the fouth-fide of the frith of Sutherland, feven miles north of Cromartie: weft long. 3° 38′, north lat. 58°.

TAINT, in law, fignifies either a conviction; or the perfon convicted, of fome treafon, felony, &c. See the article TREASON and FELONY.

TAITCHEU, a city and port-town of China, fituated on the coaft of the Pacific Ocean, in eaft long. 121°, north lat. 29°.

TALAMONE, a port-town of Tufcany, fifteen miles north of Orbitello.

TALAVERA, a town of Eftremadura, in Spain, fourteen miles eaft of Badajos.

TALC, or TALK, in natural hiftory, a large clafs of foffil bodies, compofed of broad, flat, and fmooth laminæ or plates, laid evenly and regularly on one another; eafily fiffile, according to the fite of thefe plates, but not all fo in any other direction; flexile and elaftic; bright, fhining, and tranfparent; not giving fire with fteel, nor fermenting with acid menftrua, and fuftaining the force of a violent fire without calcining.

Talcs are divided into two orders; the firft of which are compofed of plates of great extent, each making fingly the whole horizontal furface of the mafs.

The genera of the firft order are two: the firft is of thofe compofed of vifibly feparate plates of extreme thinnefs; and each fiffile again into a number of others yet finer: the talcs of this genus are called fpeculares. See plate CCLXVII. fig. 1.

The fecond genus is of thofe which are compofed of feparate plates of confiderable thicknefs, and thofe not fiffile into any thinner. The talcs of this genus are called hyalinæ, *ibid.* fig. 2.

The talcs of the fecond order are thofe compofed of fmall plates, in form of fpangles, irregularly difpofed, and ufually many of them concurring in different directions, to the formation of one of the furfaces of the mafs.

The genera of the fecond order are alfo two: the firft is of thofe compofed of fmall plates, in form of fpangles, each fiffile into many yet finer and thinner ones: the talcs of this genus are called bractearia. *ibid.* fig. 3, and 4.

The fecond genus is of thofe compofed of fmall plates in form of fpangles, which are moderately thick, and are either not fiffile at all, or are only fo to a certain degree, or into a fmall number of others yet thick ones, and thofe no farther fiffile: the talcs of this laft genus are called elafmides. *ibid.* fig. 5, and 6.

Talcs, though of no manner of ufe in medicine, are neverthelefs ufed in many arts and manufactures; for a farther account of which, fee SPECULARIS, &c.

*Philofophic* TALC, an appellation given by fome to the flowers of zink. See ZINK.

TALENT, money of account amongft the antients. See the articles COIN and MONEY.

Amongft the Jews, a talent in weight was equal to 60 maneh, or 113 ℔. 10 oz. 1 dwt. 10 $\frac{2}{7}$ gr.

TALES, in law, a word ufed for a fupply of men impannelled on a jury, and not appearing; or upon appearance, being challenged for the plaintiff or defendant, as not indifferent; in which cafe the judge, upon motion, of courfe grants a fupply to be made by the fheriff, of fome perfons there prefent, equal in reputation to thofe that are impannelled. Where a perfon has had one tales, he may have another, but not have the latter to contain fo many as the former, becaufe the firft tales muft be under the number of the principal panel, except in the cafe of appeal; and in like manner every tales is to be lefs than other, until the whole number be made ufe of, are perfons without exception. There are two kinds of tales, the one de circumftantibus, and the other a decem tales: that of circumftantibus, is, when a full jury does not appear at the nifi prius, or fo many are challenged as not to have a full jury; on which motion being made, the judge will grant this tales, which the fheriff immediately returns into court. A decem tales is when a full jury does not appear at a trial at bar, in which cafe this writ goes out to the fheriff, commanding him to apponere decem tales.

TALIO, *lex talionis*, a fpecies of punifhment in the mofaic law, whereby an evil is returned fimilar to that committed againft us by another; hence that expreffion, eye for eye, tooth for tooth. This law was at firft inferted in the twelve tables amongft the Romans, but afterwards fet afide, and a power given to the prætor to fix upon a fum of money for the damage done.

TALISMANS, magical figures cut or engraved with fuperftitious obfervations on the characterifms and configurations of the heavens, to which fome aftrologers have attributed wonderful virtues, particularly that of calling down celeftial influences. The talifmans of Samothrace, fo famous of old, were pieces of iron formed into certain images, and fet in rings; thefe were efteemed prefervatives againft all kinds of evils. There were likewife talifmans taken from vegetables, and others from minerals. There is a general divifion of talifmans into three kinds. 1. Aftronomical, which are known by the figns or conftellations of the heavens engraven thereon, with other figures, and fome unintelligible characters. 2. Magical, which bear very extraordinary figures, with fuperftitious words, and names of angels unheard of. 3. Mixt, which confift of figns and barbarous names, but without fuperftitious ones, or names of angels unknown.

There have been fome rabbins who maintained, that the brafen ferpent raifed by Mofes, was a talifman.

TALK, or TALC, in natural hiftory. See the article TALC.

TALLAGE, in law-books, is a general name for all taxes: hence, *tallagium facere*, is to give up accounts into the exchequer, where the method of accounting is by tallies. See TALLY.

TALLARD, a town of Dauphine, in France, fituated on the river Durance, forty-feven miles fouth of Grenoble.

TALLEMONT, a town of Guienne, in France, fituated near the mouth of the river Garonne, forty miles fouth of Rochelle.

TALLOW, in commerce, the fat of certain animals, melted down and clarified, fo as to be fit for making candles, *&c.* See the article CANDLE.

Tallow, imported from abroad, pays for every hundred weight, a duty of 7s. $10\frac{75}{100}$d. and draws back, on being exported again 7 s. 6 d.

TALLOW-TREE, a remarkable tree growing in great plenty in China; fo called, from its producing a fubftance like tallow, which ferves for the fame purpofe: it is about the height of a cherry-tree, its leaves in form of a heart, of a deep fhining red colour, and its bark very fmooth. Its fruit is inclofed in a kind of pod, or cover like a chefnut, and confifts of three round white grains, of the fize and form of a fmall nut, each having its peculiar capfula, and within a little ftone. This ftone is encompaffed by a white pulp which has all the properties of true tallow, both as to confiftence, colour, and even fmell; and accordingly the Chinefe make their candles of it; which would doubtlefs be as good as thofe in Europe, if they knew how to purify their vegetable, as well as we do our animal, tallow.

All the preparation they give it, is to melt it down and mix a little oil with it, to make it fofter and more pliant. It is true their candles made of it yield a thicker fmoke, and a dimmer light, than ours; but thofe defects are owing in a great meafure to the wicks, which are not of cotton, but only a little rod, of dry light wood covered with the pith of a rufh wound round it; which, being very

very porous, ſerves to filtrate the minute parts of the tallow, attracted by the burning ſtick, which by this means is kept alive.

TALLY, in law, a piece of wood cut in two parts, whereon accounts were antiently kept, by means of notches; one part of the tally being kept by the debtor, and the other by the creditor.

As to the tallies of loans, one part thereof is kept in the exchequer, and the other part given to particular perſons in lieu of an obligation for the monies they have lent to the government on acts of parliament. This laſt part is called the ſtock, and the former the counter ſtock, or counter tail.

Tallies of debt, are a kind of acquittance for debt paid to the king, upon the payment of which every debtor receives one of theſe tallies; and on carrying the ſame to the clerk of the pipe-office, has an acquittance there given him, on parchment, for his full diſcharge.

Tallies of reward, were an allowance made to ſheriffs for ſuch ſums as they have caſt upon them in their accounts, but cannot levy.

TALMUD, or THALMUD, among the Jews, a collection of the doctrines of their religion and morality. It is the *corpus juris*, or body of the laws and cuſtoms of the Jews, who eſteem it equal to the ſcriptures themſelves. See CARAITES, RABBI, GEMARA, *&c.*

TALON, in architecture, a kind of moulding, which conſiſts of a cymatium, crowned with a ſquare fillet; frequently found to terminate joiners-work, as thoſe of doors, windows, *&c.*

TALPA, the MOLE, in zoology. See the article MOLE.

TALPA, in ſurgery, a name given to encyſted tumours, when ſituated under the ſcalp.

TALUS, in anatomy, the ſame with the aſtragalus. See ASTRAGALUS.

TALUS, or TALUT, in architecture, the inclination or ſlope of a work; as of the outſide of a wall, when its thickneſs is diminiſhed by degrees, as it riſes in height to make it the firmer.

TALUS, in fortification. Talus of a baſtion, or rampart, is the ſlope or diminution allowed to ſuch a work, whether it be of earth or ſtone, the better to ſupport its weight.

The exterior talus of a work, is its ſlope on the ſide towards the country; which is always made as little as poſſible, to prevent the enemies ſcalado; unleſs the earth be bad, and then it is abſolutely neceſſary to allow a conſiderable talus for its parapet. The interior talus of a work is its ſlope on the inſide towards the place.

TAMANDUA, in zoology, the ſame with the myrmecophaga. See the article MYRMECOPHAGA.

TAMAR, a river, which divides Devonſhire from Cornwall, running from north to ſouth.

TAMARIND, *tamarindus*, in botany, a genus of the triandria-monogynia claſs of plants, the flower of which conſiſts of three or four ovated and equal petals; and its fruit is a long compreſſed pod, containing three angulated and compreſſed ſeeds.

The pod is made up of a double rind, or membrane, between which is a pulpy matter; which taken in the quantity of two or three drams, or an ounce or more, proves gently laxative or purgative; and at the ſame time, by its acidity, quenches thirſt, and allays immoderate heat. It increaſes the action of the purgative ſweets, caſſia and manna, but weakens that of the reſinous cathartics: ſome have ſuppoſed it capable of abating the virulence of antimonial preparations; but experience ſhews, that it has a contrary effect, and that all vegetable acids augment their power: it is alſo recommended in diarrhœas, and nephritic complaints, and is ſaid to cure the jaundice without the aſſiſtance of any other medicine.

TAMARISK, *tamariſcus*, or *tamarix*, a genus of trees belonging to the pentandria-trigynia claſs of plants; its flower is roſaceous, and conſiſts of five ovated, concave and obtuſe, patent petals: the fruit is an oblong and triquetrous capſule, containing a great many very ſmall and pappoſe ſeeds.

The bark and leaves of the tamariſk-tree are moderately aſtringent, but never preſcribed in the preſent practice.

TAMBAC, a mixture of gold and copper, which the people of Siam hold more beautiful, and ſet a great value on, than gold itſelf.

TAMBOUR, in architecture, a term applied to the corinthian and compoſite capitals, as bearing ſome reſemblance to a drum, which the french call tambour.

TAMBOUR is alſo uſed for a little box of timber-work covered with a ceiling, within-ſide the porch of certain churches, both

both to prevent the view of perfons paffing by, and to keep off the wind, &c. by means of folding doors.

TAMBOUR alfo denotes a round courfe of ftone, feveral whereof form the fhaft of a column, not fo high as a diameter.

TAME, a market-town of Oxfordfhire, fituated on the river Tame, ten miles eaft of Oxford.

TAMNUS, or TAMUS, BLACK BRYONY, in botany, a genus of the dioecia-hexandria clafs of plants, without any corolla: the calyx is divided into fix parts; the fruit is a trilocular berry, fituated below the calyx, and containing two feeds in each cell.

The root of this plant is faid to be fomewhat poifonous, whence it frequently proves of bad confequence, when adminiftered inftead of the white bryony.

TAMOATA, in ichthyology, the name by which fome call the callichthys or ftromateus. See STROMATEUS.

TAMPION, or TOMPION, among gunners, a plug to ftop the mouths of cannons, mortars, &c. to keep them clean within.

TAMUS, or TAMNUS. See TAMNUS.

TAMWORTH, a borough of Staffordfhire, fituated twenty miles fouth-eaft of Stafford.

It fends two members to parliament.

TAN, the bark of the oak, chopped and ground, in a tanning-mill, into a coarfe powder, to be ufed in the tanning of leather. See the article TANNING.

New tan is the moft efteemed; for when old and ftale it lofes a great deal of its effects, which confifts in condenfing and clofing the pores of the fkin, fo that the longer the fkins are kept in tan, the greater ftrength and firmnefs they acquire. In effect, not only the bark, but every part of the oak-tree, of what age and growth foever, and all oaken coppice, &c. cut in barking-time, make good tan, as good at leaft as the beft bark. This when got, is to be well dried in the fun, houfed dry, and kept fo. When it is to be ufed, the greater wood muft be fhaved fmall, or cut for the tan engine, and the fmaller bruifed, or cut fmall by the engine, after which it muft be dried on a kiln, &c. See the article TANNING ENGINES.

For the ufe of tan in gardening, fee the article STOVES.

TANACETUM, in botany, a genus of the fyngenefia-polygamia æqualis clafs of plants, with a compound, tubulofe and convex flower, the leffer corollulæ of which are funnel-fafhioned, and quinquifid at the limb: a fingle feed fucceeds each leffer flower, and is contained in the cup. See plate CCLXVIII. fig. 3.

This genus comprehends the common tanzy, coftmary, &c. Tanzy, confidered as a medicine, is a moderately warm bitter, and is much extolled by fome in hyfteric complaints, efpecially if proceeding from a deficiency or fuppreffion of the uterine purgations: its feeds and leaves have been in confiderable efteem as anthelmintics; and are faid to be good in colics and flatulencies.

TANAIS, or DON RIVER. See DON.

TANARO, a river of Italy, which rifing in the fouth of Piedmont, runs north-eaft by Afti and Alexandria, and falls into the Po below Valenza.

TANASSERIM, a city of the further India, and capital of a province of the fame name, in the kingdom of Siam: eaft long. 98°, north lat. 12°.

TANCOS, a town of Eftremadura, in Portugal, fituated on the river Tagus, fixty miles north-eaft of Lifbon.

TANDA, a town fituated on the eaft-fide of the Ganges, in the province of Bengal: eaft long. 87°, north lat. 25°.

TANDAYA, one of the moft eafterly of the Philippine iflands, fituated in eaft long. 124°, and north lat. 12°, fubject to the king of Spain.

TANGENT, in geometry, is defined, in general, to be a right-line, E T (plate CCLXVIII. fig. 2. n° 1.) which touches any arch of a curve, H E in E, in fuch a manner that no right line can be drawn through E betwixt the right-line E T and the arch E H, or within the angle H E T that is formed by them.

The tangent of an arch is a right-line drawn perpendicularly from the end of a diameter, paffing to one extremity of the arch, and terminated by a right-line drawn from the center through the other end of the arch, and called the fecant. See SECANT and SINE.

And the co-tangent of an arch, is the tangent of the complement of that arch. See ARCH and COMPLEMENT.

The tangent of a curve is a right-line which only touches the curve in one point, but does not cut it.

In order to illuftrate the method of drawing tangents to curves, let A C G (*ibid.* n° 2.) be a curve of any kind, and C the given point from whence the tangent is to be drawn. Then conceive a right-line,

line, *mg*, to be carried along uniformly, parallel to itſelf, from A towards Q; and let, at the ſame time, a point *p* ſo move in that line, as to deſcribe the given curve A C G: alſo let *mm*, or C *n*, expreſs the fluxion of A *m*, or the velocity wherewith the line *mg* is carried; and let *n* S expreſs the correſponding fluxion of *mp*, in the poſition *m* C *g*, or the velocity of the point *p*, in the line *mg*: moreover, through the point C let the right-line S F be drawn, meeting the axis of the curve, A Q, in F.

Now it is evident, if the motion of *p*, along the line *mg*, was to become equable at C, the point *p* would be at S, when the line itſelf had got into the poſition *m* S *g*; becauſe, by the hypotheſis, C *n* and *n* S expreſſes the diſtances that might be deſcribed by the two uniform motions in the ſame time. And if *wsg* be aſſumed to repreſent any other poſition of that line, and *s* the contemporary poſition of the point *p*, ſtill ſuppoſing an equable velocity of *p*; then the diſtances C *v*, and *vs*, gone over in the ſame time by the two motions, will always be to each other as the velocities, or as C *n* to *n* S. Therefore, ſince C *v* : *vs* : : C *n* : *n* S (which is a known property of ſimilar triangles) the point *s* will always fall in the right-line F C S: *ib.* n° 3, whence it appears, that if the motion of the point *p* along the line *mg* was to become uniform at C, that point would then move in the right-line C S, inſtead of the curve-line C G. Now, ſeeing the motion of *p*, in the deſcription of curves, muſt either be an accelerated or retarded one; let it be firſt conſidered as an accelerated one, in which caſe the arch C G will fall wholly above the right-line C D, as in n° 2. becauſe the diſtance of the point *p* from the axis A Q, at the end of any given time, is greater than it would be if the acceleration was to ceaſe at C; and if the acceleration had ceaſed at C, the point *p* would have been always found in the ſaid right-line F S. But if the motion of the point *p* be a retarded one, it will appear, by arguing in the ſame manner, that the arch C G will fall wholly below the right-line C D, as in n° 3.

This being the caſe, let the line *mg*, and the point *p*, along that line, be now ſuppoſed to move back again, towards A and *m*, in the ſame manner they proceeded from thence: then, ſince the velocity of *p* (*ibid.* n° 2.) did before increaſe, it muſt now, on the contrary, decreaſe; and therefore as *p*, at the end of a given time, after repaſſing the point C, is not ſo near to A Q, as it would have been had the velocity continued the ſame as at C, the arch C *h* (as well as C G) muſt fall wholly above the right-line F C D: and by the ſame method of arguing, the arch C *h*, in the ſecond caſe, will fall wholly below F C D. Therefore F C D, in both caſes, is a tangent to the curve at the point C: whence the triangles F *m* C and C *n* S being ſimilar, it appears that the ſub-tangent *m* F is always a fourth proportional to *n* S the fluxion of the ordinate C *n*, the fluxion of the abſciſs, and C *m* the ordinate; that is S *n* : *n* C : : *m* C : *m* F. Hence, if the abſciſs A *m* $= x$, and the ordinate *mp* $= y$, we ſhall have *m* F $= \frac{y\dot{x}}{\dot{y}}$; by means of which general expreſſion, and the equation expreſſing the relation between $x$ and $y$, the ratio of the fluxions $\dot{x}$ and $\dot{y}$ will be found, and from thence the length of the ſubtangent *m* F, as in the following examples.

Example I. To draw a right-line C T (*ibid.* n° 4.) a tangent to a given circle B C A, in a given point C. Let C S be perpendicular to the diameter A B, and put A B $= a$, B S $= x$, and S C $= y$. Then by the property of the circle, $y^2$ ($=$ C S$^2$) $=$ B S $\times$ A S ($= x \times \overline{a-x}$) $= ax - x^2$; whereof the fluxion being taken, in order to determine the ratio of $\dot{x}$ and $\dot{y}$, we get $2y\dot{y} = a\dot{x} - 2x\dot{x}$; conſequently $\frac{\dot{x}}{\dot{y}} = \frac{2y}{a-2x} = \frac{y}{\frac{1}{2}a-x}$; which multiplied by $y$, gives $\frac{y\dot{x}}{\dot{y}} = \frac{y}{\frac{1}{2}a-x} =$ the ſubtangent S T. Whence, O being ſuppoſed the center, we have O S ($= \frac{1}{2}a - x$) : C S ($= y$) : : C S ($= y$) : S T; which is alſo found to be the caſe from other principles. See the article CIRCLE.

Example II. To draw a tangent to any given point C (*ibid.* n° 5.) of the conical parabola A C G. If the latus rectum of the curve be denoted by $a$, the ordinate M C by $y$, and its correſponding abſciſs A M by $x$; then the known equation, expreſſing the relation of $x$ and $y$, being $ax = y^2$, we have, in this caſe, the fluxion $a\dot{x} = 2y\dot{y}$; whence $\frac{\dot{x}}{\dot{y}} = \frac{2y}{a}$, and conſequently $\frac{y\dot{x}}{\dot{y}} = \frac{2y^2}{a} = \frac{2ax}{a}, = 2x =$ M F.

There-

Therefore the fubtangent is juft the double of its correfponding abfcifs A M. And fo for finding the tangents of other fpecies of curves. See the articles CURVE, PARABOLA, ELLIPSIS, &c.

TANGERE, or NOLI ME TANGERE. See the article NOLI.

TANGERMUNDE, a town of Germany, in the circle of Upper Saxony, and marquifate of Brandenburg, fituated on the river Elbe, fifty-four miles weft of Berlin.

TANGIER, a port town of Africa, in the empire of Morocco and kingdom of Fez, fituated at the entrance of the ftraits of Gibraltar, in weft long. 7°, north lat. 35° 40′. It was the capital of the antient Mauritania Tingitana, and was once in the poffeffion of the Englifh.

TANGUT, a province of chinefian Tartary, fituated north-weft of the great wall which divides Tartary from China.

TANJOUR, a city of the hither India, capital of a province of the fame name, fituated eaft long. 79°, north lat. 11° 30′.

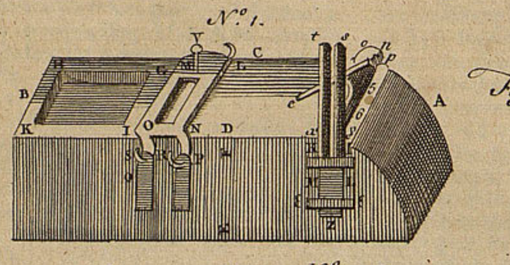
TANNER, one who dreffes hides, &c. by tanning them. See the next article.

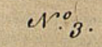
TANNING, the preparing of fkins or hides in a pit, with tan and water, after the hair has been firft taken off, by putting the fkins into lime-water. See the articles SKIN, HIDE, &c.

*Method of* TANNING *oxen-hides.* The fkin being flayed off the carcafe, if it is intended to be kept, is falted with fea-falt and alum, or with a coarfe kind of faltpetre. If it is not for keeping, the falting is faved, as being of no ufe but to prevent the hide from corrupting before it can be conveniently carried to the tanhoufe. Whether the hide have been falted or not, the tanner begins with taking off the horns, the ears, and the tail, after which it is thrown into a running water for about thirty hours, to wafh off the blood and other impurities adhering to the infide. This done, it is laid over night in a lime-pit, already ufed, whence it is taken and left to drain three or four days on the edge of the pit. The firft and flighteft preparation over, it is retained into a ftrong lime-pit for two days, then taken out for four days more; and thus for fix weeks alternately, it is taken out and put in twice a week. At the fix weeks end it is put into a frefh pit, where it continues eight days, and is then taken out for fo many, and thus alternately for a year or eighteen months, according to the ftrength of the leather and the weather; for in great heats they put in frefh lime twice a week; and in froft they fometimes do not touch them for three months. Every frefh lime-pit they throw them into, is ftronger and ftronger. At the end of four, five, or fix weeks, the tanner fcrapes off the hair on a wooden leg or horfe, with a kind of knife made for that purpofe. And after a year or eighteen months, when the hair is perfectly gone, he carries it to a river to wafh, pares off the flefh on the leg with a kind of cutting knife, and rubs it brifkly with a fort of whetftone, to take off any remains of flefh or of filth on the fide of the hair. The fkin is now put into tan, that is, it is covered with tan as it is ftretched in the pit, and water is let in upon it; if the fkin is ftrong, five coverings of tan will be required; for weaker, three or four may fuffice. When the fkin has not been kept long enough in lime, or in the tan-pit, upon cutting it in the middle there appears a whitifh ftreak, called the horn or crudity of the fkin, and it is this crudity that is the reafon why the foles of fhoes, boots, &c. ftretch fo eafily and take water. When the hides are fufficiently tanned, they are taken out of the pit to be dried, by hanging them in the air; then the tan is cleared off them, and they are put into a place neither too dry nor too moift; they are there well ftretched over one another with weights a-top, to keep them tight and ftrait; and in this condition are fold under the denomination of bend-leather. This is the method of tanning bullocks or oxen-hides. Cows, calves, and horfes fkins are tanned much after the fame manner of thofe of oxen, except that they are only kept four months in the lime pit, and that before they be put in the tan, there is a preparation required thus: cold water is poured into a wooden vat, or tub, wherein the fkins are put, which are kept ftirring while fome other water is warming in a kettle; and as foon as that water is little more than luke-warm, it is poured gently into the vat, and upon this is caft a bafket of tan; during which time the fkins are ftill kept turning, that the water and tan may not fcorch them. After an hour they are taken out and caft for a day into cold water, then returned to the former vat and the fame water they had been in before, and here they are left for eight days: which expired, they are put into the tan-pit, and three coverings of tan given them; the firft of which lafts five

 weeks,

*Fig. 1.* TANNING-ENGINE and MILL.



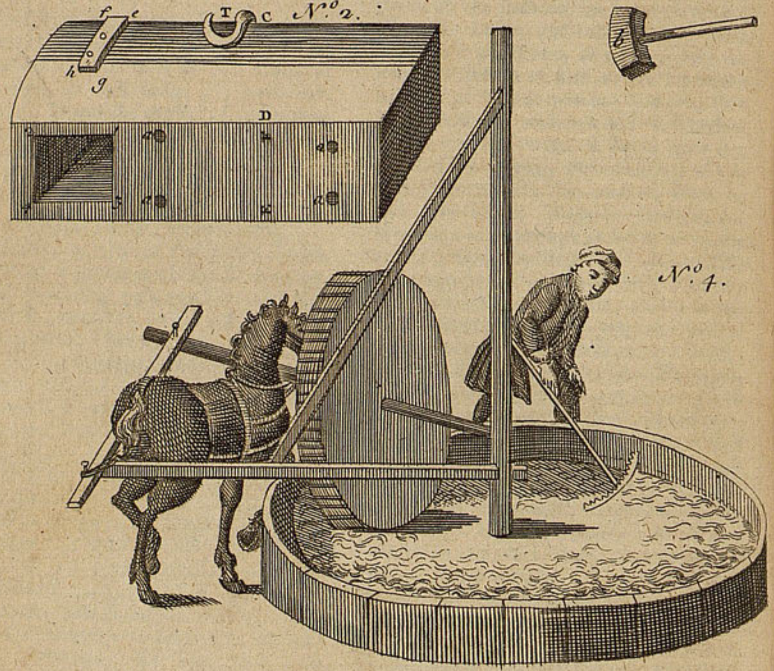
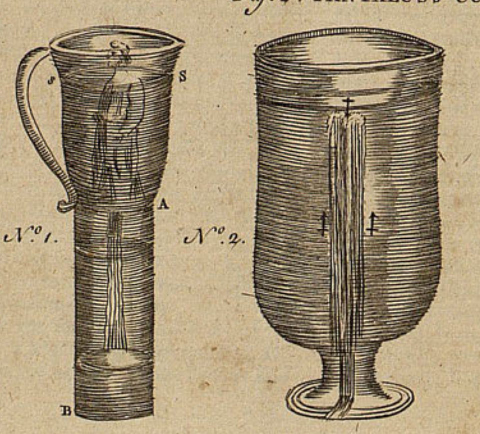




*Fig. 2.* TANTALUS's CUP.






*T. Jefferys sculp.*

weeks, the second six, and the third two months. The rest of the process is the same in all respects as that delivered above. See the articles TAN, LEATHER, and the next article.

TANNING ENGINES, machines used by tanners for beating, cutting, and grinding tan, or the materials used in tanning. See TAN, and the preceding article.

The machine for cutting tan, as represented in plate CCLXIX. fig. 1. n° 1, 2. consists of a long square wooden block, which is best of oak or elm; and of some pieces of iron to be fastened on it, and used about it, *viz.* an anvil, a hammer, an iron holding the wood to be bruised and cut, and a knife. A B, n° 1. is the length of the block, being about four feet; C D the breadth, which is fifteen or sixteen inches; E F the depth, eight or ten inches; G H I K a square cavity to receive a plate of iron, serving for an anvil to beat and bruise the tanning materials upon; this is to be about four inches deep, nine inches broad, and twelve inches long; L M N O the iron for clasping and holding fast the materials to be bruised and cut, which must lie cross the engine, about the middle of the said piece of timber, and may be about three inches broad; P Q are two hooks at one end of it, which are turned upwards, and must be hooked into the loops of the two hinges that are let in and fastened to the sides of the engine R S, in such a manner that this clasping-piece may be a little raised for putting the tanning materials under it. At the side T, (*ibid.* n° 2.) is a single hook turned also upwards, to hang a weight upon it, whilst the stuff is a bruising by the anvil, or a cutting by the knife. The button in n° 1. serves to take up this piece by; *a a a a* on the other side of the block, n° 2. are the places for the four feet of the engine, which are to be of a convenient height to work upon it. *b* (*ibid.* n° 3.) is the hammer for beating and bruising the stuff, which may be of six pounds weight, and the head about three inches square, to work with both hands; but for one hand, it may be made of three pounds weight, and the head about two inches square: the surface of one end of these hammers should be smooth, but that of the other indented. *c d*, n° 1. the knife for cutting the bruised stuff, which must be eight or nine inches long, and near as much in breadth, made like a tobacco-knife, with a handle, and fastened to the block at the two opposite sides, that are to be hollowed, with two grooves, *e f g h*, n° 2. and *i k l m*, n° 1. with two pieces of iron fitted in the grooves, to hold and guide the knife in cutting. *n o p q*, n° 1. is to be fastened to the end of the knife *c*, by a pin *r*, passing through three holes; and this end is to be screwed into the groove *e f g h*, n° 2. by a couple of screw-pins; the other piece, *s t u x y z*, n° 1. being forked in, is to receive the other end of the knife *d*, and the solid square part thereof, I K L M, is to be fastened in the groove under it by two iron-plates *a a e e*, under which it must run in the said groove so as to be slipped out from under it, and laid by when the machine is not used, when also the piece at the other end may be unscrewed and laid up. The long squares upon one end of the block, *viz.* 5, 6, 7, 8, n° 1. are two iron plates, to be fastened where the knife, moving in a fit cavity, is to cut the bruised stuff between them; and of these plates that which lies next the end is to be laid a little lower, the block being there pared accordingly, that so the stuff may fall off from the end of the machine the quicker, as the left-hand supplies the bruised materials, whilst the right-hand cuts them. Let the hollow place where the knife cuts be as near as possible, only large enough for the knife to rise and fall easily; and let the block be hollowed under the cutting-hole, and sloped off at that end, for the stuff to fall off, as it is cut by the knife.

The stuff being cut small by the engine, is to be well dried again on a kiln, and then ground into a coarse powder upon the mill, being a large round wooden trough, with a pretty large stone set on edge in it, and turned round by a horse, as represented *ibid.* n° 4.

TANT, or the LITTLE SCARLET-SPIDER, in the history of insects, the red land acarus, with a depressed body. See the article ACARUS.

This is a small species, its body is roundish but a little approaching to oval; the back somewhat depressed; it is of a fine scarlet colour, and covered with a velvety down.

TANTALUS's CUP, in hydraulics, a siphon so adapted to a cup, that the short leg being in the cup, the long leg may go down through the bottom of the cup. See the article SIPHON.

This bended siphon is called Tantalus's cup,

cup, from the refemblance of the experiment made with an image in the glafs, reprefenting Tantalus in the fable, fixed up in the middle of the cup with a fiphon concealed in his body, beginning in the bottom of his feet, and afcending to the upper part of his breaft; there it makes a turn, and defcends through the other leg, on which he ftands; and from thence down through the bottom of the cup, where it runs out, and caufes the water to fubfide in the cup: as foon as it rifes to the height of the fiphon, or to the chin of the image, which is above S *s*, plate CCLXIX. fig. 2. n° 1. the water will begin to run through the fiphon concealed in the figure, till the cup is emptied in the manner explained under fiphon, and reprefented more diftinctly in *ibid.* n° 2.

Sometimes the Tantalus's cup is made without a figure fixed in it, as *ibid.* no 3. where the water being up at S *s*, the cup does not run; but as foon as the figure, or an apple, or orange, &c. is thrown in, the water begins to run out at the foot of the cup, and does not ceafe till the whole cup is empty. This happens becaufe the body thrown into the cup, raifes the water's furface from S *s* to BC, where being above the upper end S of the pipe S P concealed in the handle, which thereby is made a fiphon, the water, which is come into the handle at O, runs into the middle pipe at *s*, and fo out at P, under the foot, fo long as there is any water above O.

TANTAMOUNT, fomething that amounts, or is equivalent, to fome other.

TANTUM DECIES. See the article DECIES TANTUM.

TANZY. *tanacetum,* in botany. See the article TANACETUM.

TAORMINA, a port-town of Sicily, fituated in the province of Demona, eighteen miles fouth of Meffina.

TAP, among hunters, an hare is faid to tap or beat, when fhe makes a particular noife at rutting-time.

TAP ROOT, among gardiners, that part of the root that defcends ftraight down.

TAPASSANT, among hunters, denotes lurking or fquatting.

TAPE WORM, in the hiftory of infects, the flat tænia, frequently growing to the length of feveral ells. See TÆNIA.

This creature is found in the human inteftines, and in thofe of many other animals, as well fifh as quadrupeds.

TAPER, TAPERING, is underftood of a piece of timber, or the like, when broad at one end and gradually diminifhing to the other, as is the cafe in pyramids, cones, &c.

TAPER BOARD, is applied to a piece of ordnance when it is wider at the mouth than towards the breech.

TAPER alfo denotes a kind of tall wax-candle placed in a candleftic, and burnt at funeral proceffions, and in other church-folemnities. Tapers are made of different fizes; in fome places, as Italy, &c. they are cylindrical, but in moft other countries, as England, France, &c. they are conical or taper; both kinds are pierced at the bottom for a kind of pin in the candleftic to enter. For the method of making tapers, both by the ladle and by the hand, fee the articles CANDLE and FLAMBEAU.

*Pafchal* TAPER, among the romanifts, a large taper whereon the deacon applies five bits of frankincenfe in holes made for the purpofe in form of a crofs, and which he lights with new fire in the ceremony of Eafter-Sunday.

TAPESTRY, or TAPISTRY, a curious kind of manufacture, ferving to adorn a chamber or other apartment, by covering or lining the walls thereof. It is a kind of woven hangings of wool and filk, frequently raifed and inriched with gold and filver, reprefenting figures of men, animals, landfkips, hiftories, &c.

The invention of tapeftry feems to have come to us from the Levant; and this feems the more probable, in that the workmen concerned in it were called, at leaft in France, farrafins, or forrafinois. It is fuppofed that the Englifh and Flemifh, who were the firft that excelled in making tapeftry, might bring the art with them from fome of the croifades, or expeditions againft the Saracens. Be this as it will, it is certain that thefe two nations, efpecially the Englifh, were the firft who fet on foot this noble and rich manufacture in Europe, now one of the fineft ornaments of palaces, churches, &c. and therefore if they may not be allowed the inventors, they have at leaft the glory of being the reftorers of this fo curious and admirable an art, as gives a kind of life to wools and filks, in no refpect inferior to the paintings of the beft mafters.

Tapeftry-work is diftinguifhed by the workmen into two kinds, *viz.* that of high, and that of low warp; though the difference is rather in the manner of work-

ing

ing than in the work itſelf; which is in effect the ſame in both; only the looms, and conſequently the warps, are differently ſituated. Thoſe of the low warp being placed flat and parallel to the horizon, and thoſe, on the contrary, of the high warp erected perpendicularly. The Engliſh antiently excelled all the world in the tapeſtry of the high warp, and they ſtill retain their former reputation, though with ſome little change: their low warps are ſtill admired; but, as for the high ones, they are quite laid aſide by the French. The French have three conſiderable tapeſtry-manufactures beſides that of the Gobelins; the firſt at Aubuſſon in Auvergne, the ſecond is at Felletin in the Upper Marche, and the third at Beauvais. They were all equally eſtabliſhed for the high and the low warp; but they have all laid aſide the high warp, excepting the Gobelins. There are admirable low warps in Flanders, generally exceeding thoſe of France; the chief and almoſt only Flemiſh manufactures are at Bruſſels, Antwerp, Oudenard, Liſle, Tournay, Bruges, and Valenciennes.

The uſual widths of tapeſtries are from two ells to three ells Paris-meaſure.

*The manufacture of* TAPESTRY *of the high warp.* The loom, whereon it is wrought, is placed perpendicularly: it conſiſts of four principal pieces; two long planks or cheeks of wood, and two thick rollers or beams. The planks are ſet upright, and the beams acroſs them, one at the top, and the other at the bottom, or about a foot diſtance from the ground. They have each their trunnions, by which they are ſuſpended on the planks, and are turned with bars. In each roller is a groove from one end to the other, capable of containing a long round piece of wood, faſtened therein with hooks. The uſe of it is to tie the ends of the warp to. The warp, which is a kind of worſted, or twiſted woollen thread, is wound on the upper roller; and the work, as faſt as wove, is wound on the lower. Withinſide the planks, which are ſeven or eight feet high, fourteen or fifteen inches broad, and three or four thick, are holes pierced from top to bottom, in which are put thick pieces of iron, with hooks at one end, ſerving to ſuſtain the coat-ſtave: theſe pieces of iron have alſo holes pierced, by putting a pin in which, the ſtave is drawn nearer or ſet further off; and thus the coats or threads are ſtretched or looſened at pleaſure. The coat-ſtave is about three inches diameter, and runs all the length of the loom; on this are fixed the coats or threads, which make the threads of the warp croſs each other. It has much the ſame effect here, as the ſpring-ſtave and treddles have in the common looms. The coats are little threads faſtened to each thread of the warp with a kind of ſliding knot, which forms a ſort of maſh or ring. They ſerve to keep the warp open for the paſſage of broaches wound with ſilks, woollens, or other matters uſed in the piece of tapeſtry. In the laſt place, there are a number of little ſticks of different lengths, but all about an inch in diameter, which the workman keeps by him in baſkets, to ſerve to make the threads of the warp croſs each other, by paſſing them acroſs: and, that the threads thus croſſed may retain their proper ſituation, a packthread is run among the threads, above the ſtick.

The loom being thus formed, and mounted with its warp, the firſt thing the workman does, is to draw on the threads of this warp, the principal lines and ſtrokes of the deſign to be repreſented on the piece of tapeſtry; which is done by applying cartoons, made from the painting he intends to copy, to the ſide that is to be the wrong ſide of the piece, and then, with a black-lead pencil, following and tracing out the contours thereof on the thread of the right ſide; ſo that the ſtrokes appear equally both before and behind.

As for the original deſign the work is to be finiſhed by, it is hung up behind the workmen, and wound on a long ſtaff from which a piece is unrolled from time to time, as the work proceeds.

Beſides the loom, &c. here deſcribed, there are three other principal inſtruments required for working the ſilk or the wool of the woof within the threads of the warp; theſe are a broach, a reed, and an iron-needle.

The broach is made of a hard wood, ſeven or eight inches long, and two thirds of an inch thick, ending in a point with a little handle. This ſerves as a ſhuttle; the ſilks, woollens, gold, or ſilver to be uſed in the work, being wound on it.

The reed or comb is alſo of wood, eight or nine inches long, and an inch thick on the back, whence it grows leſs and leſs to the extremity of the teeth, which are more or leſs apart, according to the greater or leſs degree of fineneſs of the intend-

ed work. Laftly, the needle is made in form of the common needle, only bigger and longer. Its ufe is to prefs clofe the wool and filks when there is any line or colour that does not fit well.

All things being prepared for the work, and the workman ready to begin, he places himfelf on the wrong fide of the piece, with his back towards the defign; fo that he works as it were blind-fold, feeing nothing of what he does, and being obliged to quit his poft, and go to the other fide of the loom, whenever he would view and examine the piece, to correct it with his preffing needle. To put filk, &c. in the warp, he firft turns and looks at the defign, then, taking a broach full of the proper colour, he places it among the threads of the warp, which he brings crofs each other with his fingers, by means of the coats or threads, faftened to the ftaff; this he repeats every time he is to change his colour. Having placed the filk or wool, he beats it with his reed or comb; and when he has thus wrought in feveral rows over each other, he goes to fee the effects they have, in order to reform the contours with his needle, if there be occafion. As the work advances, it is rolled upon the lower beam, and they unrol as much warp from the upper beam, as fuffices them to continue the piece: the like they do of the defign behind them. When the pieces are wide, feveral workmen may be employed at once.

We have but two things to add: the firft is, that the high-warp tapeftry goes on much more flowly than the low-warp, and takes up almoft twice the time and trouble. The fecond is, that all the difference that the eye can perceive between the two kinds, confifts in this, that in the low-warp there is a red fillet, about one twelfth of an inch broad, running on each fide from top to bottom, which is wanting in the high-warp.

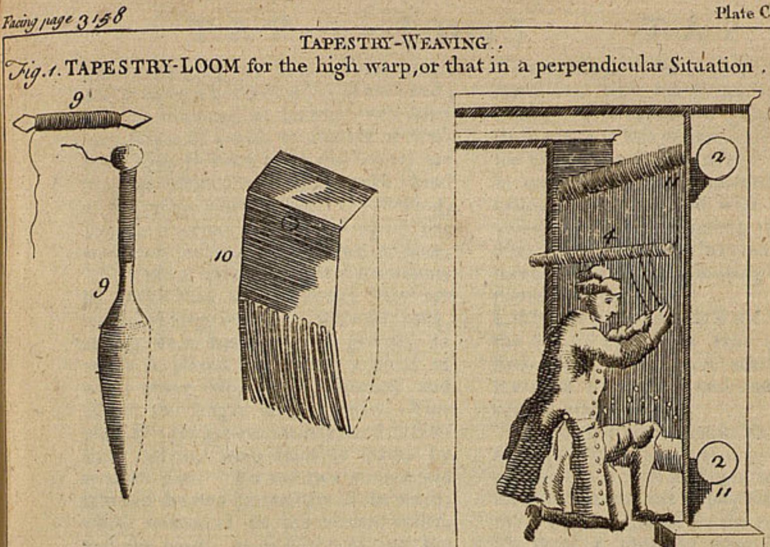
But, for the fatisfaction of our readers, we fhall here prefent them with a reprefentation of the loom for the manufacture of tapeftry of the high-warp, or that in a fituation perpendicular to the horizon. See plate CCLXX. fig. 1. where 1, 1, reprefent the loom-pofts, or the thick planks, which fupport the rollers. 2, The rollers; the upper end holds the chain, the lower holds the tapeftry, which is rolled upon it, according as the work goes forward: the threads are faftened at their ends to a dweet, or thick rod, which is lodged in a groove made on each roller. 3, The two tantoes; one called the great tantoe, for turning the upper roller; the other the little tantoe, for turning the lower roller. 4, The pole of the leifhes, which runs quite acrofs the chain, takes up all the leifhes, and brings them to the workman's hand. Thefe leifhes are little ftrings, tied by a flip-knot to each thread of the chain, to be raifed up according as the chain finks down: they ferve to draw the particular thread which the weaver wants: he holds the thread feparate from the reft, and paffes a fpindle of fuch a woof and colour as he thinks proper; then he lets the fpindle hang down, and hinders the thread from running off, by a flip-knot. After having taken one or two threads of the fore-part of the chain by another leifh, he brings the threads of the oppofite fide to him. By this alternative work he conftantly makes them crofs one another, to take in and fecure the woof. In order to diftinguifh the threads of both fides, he is affifted by the crofs rod, which is put between two rows of threads. 5, A long tract of dots formed by the ends of the leifhes, which take hold of the leifhes of the chain by a flip-knot; and on the other hand encompafs the pole of the leifhes. 6, The crofs-rod. 7, A little chain, each loop of which contains four or five threads of the warp, and keeps them perpendicular. 8, An iron-hook, to fupport the pole of the leifhes. 9, 9, 9, The broacher-quill, to pafs the threads of the woof, which is wound on it. 10, The comb, to ftrike in the work. 11, The end of the dweet let into the roller, in a groove.

When the chain is mounted, the draughtfman traces the principal out-lines of the picture, which is to be wrought, with black chalk on the fore and back fide of the chain. The weaver in the upright way having prepared a good ftock of quills, filled with threads of all colours, goes to work, placed on the back part, as in the flat way, or in the manufacture of the low-warp. He has behind him his drawings, on which he frequently looks, that he may from time to time fee how his work fucceeds on the right or fore fide, which the other cannot do.

*The manufacture of* TAPESTRY *of the low-warp.* The loom or frame wherein the low-warp is wrought, is much like that of the weavers; the principal parts thereof (*ibid*, fig. 2.) are two ftrong pieces of wood,

TAPESTRY-WEAVING.

Fig. 1. TAPESTRY-LOOM for the high warp, or that in a perpendicular Situation.



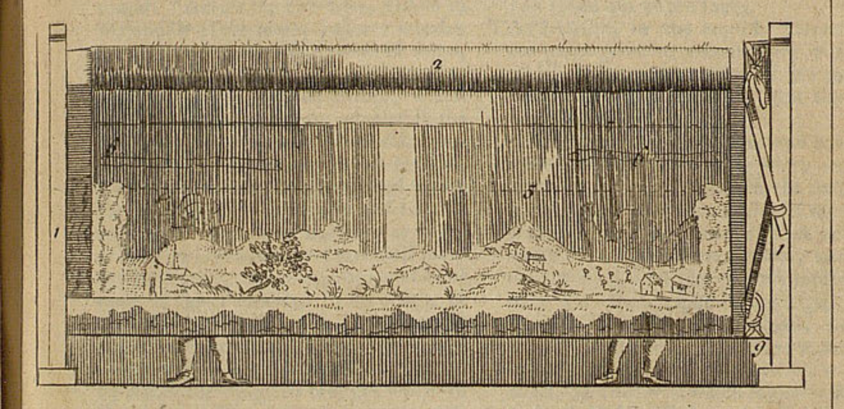
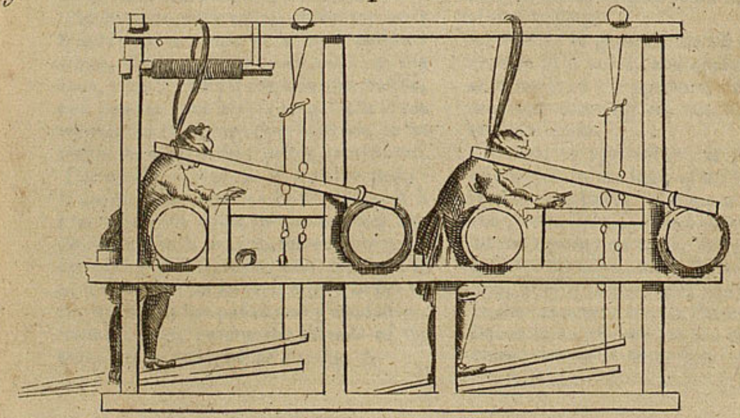




Fig. 2. TAPESTRY-LOOM for the low Warp, or that in an horizontal Situation.



J. Jefferys sculp.

wood, forming the fides of the loom, and bearing a beam or roller at each end; they are fuftained at bottom with other long pieces of wood, in manner of treffels: and, to keep them the firmer, are likewife faftened to the floor, with a kind of buttreffes, which prevent any fhaking, though there are fometimes four or five workmen leaning on the beam at once. The rollers have each their trunnions, by which they are fuftained; they are turned by large iron-pins, three feet long. Along each beam runs a groove, in which is placed the wich, a piece of wood above two inches diameter, and almoft the length of the roller. This piece fills the groove intirely, and is faftened therein, from fpace to fpace, by wooden-pins. To the two wiches are faftened the two extremities of the warp, which is wound on the further roller, and the work, as it advances, on the nearer. Acrofs the two fides, almoft in the middle of the loom, paffes a wooden bar, which fuftains little pieces of wood, not unlike the beam of a ballance: to thefe pieces are faftened ftrings, which bear certain fpring ftaves, wherewith the workman, by means of two treddles under the loom, on which he fets his feet, gives a motion to the coats, and makes the threads of the warp rife and fall alternately. Each loom has more or fewer of thefe fpring-ftaves, and each ftaff more or fewer coats, as the tapeftry confifts of more or fewer threads. The defign or painting the tapeftry-man is to follow, is placed underneath the warp, where it is fuftained from fpace to fpace with ftrings, by which the defign is brought nearer to the warp. The loom being mounted, there are two inftruments ufed in working of it, *viz.* the reed and the flute.

The flute does the office of the weaver's fhuttle: it is made of a hard polifhed wood, three or four lines thick at the ends, and fomewhat more in the middle, and three or four inches long. On it are wound the filks, or other matters, to be ufed as the woof of the tapeftry, reprefented.

The comb, or reed, is of wood or ivory: it has ufually teeth on both fides; it is about an inch thick in the middle, but diminifhes each way to the extremity of the teeth; this ferves to beat the threads of the woof clofe to each other, as faft as the workman has paffed and placed them, with his flute, among the threads of the warp, as reprefented at 10. fig. 1.

The workman is feated on a bench before the loom, with his breaft againft the beam, only a cufhion or pillow between them; and in this pofture feparating with his fingers the threads of the warp, that he may fee the defign underneath; and taking a flute, wound with the proper colour, he faftens it among the threads, after having raifed or lowered them, by means of the treddles, moving the fpring-ftaves and coats.

Laftly, to prefs and clofe the threads of the filk or yarn, *&c.* thus placed, he ftrikes each courfe (*i. e.* what the flute leaves in its paffing and coming back again) with the reed.

That which is very remarkable in the manufacture of the low-warp, and which is common to it with the high, is, that it is all wrought on the wrong fide; fo that the workman cannot fee the right fide of his tapeftry, until the piece is finifhed, and taken out of the loom.

TAPLINGS, in the englifh falt-works, the name given to certain bars of iron, which fupport the bottom of the pan in which the brine is boiled. See the article SALT.

Thefe pans are very large, and cover a wide furnace; but as their width would make them apt to bend in the middle, which would fpoil the working of the falt, there is a fort of wall made of brick carried along the middle of the furnace, and on the top of this are placed thefe taplings; they are about eight inches high, and from four to fix in thicknefs, being fmalleft at the top. Thefe are placed at about three foot diftance one from another, and the wall which fupports them, and which is called the midfeather, is broad at the bafe, and fo narrow at the top, as barely to give room for the bafes of the taplings.

TAPPING, in general, the act of piercing an hole in a veffel, and applying a tube or cannula in the aperture, for the commodious drawing off the liquors contained therein.

TAPPING, in agriculture, is the making an incifion in the bark of a tree, and letting out the juice. To tap a tree at the root, is to open it round about the root. In the tapping of trees, the juice taken in from the earth, afcends from the root; and, after it is concocted and affimilated, in the branches, *&c.* it defcends, like a liquor in an alembic, to the orifice or incifion, where it iffues out. One of the

moſt effectual ways of tapping, ſo as to obtain the greateſt quantity of ſap, and that in the ſhorteſt time, is not only to pierce the bark, or to cut the body of the tree almoſt to the pith with a chiſſel (as ſome have directed), but to bore through all the circles on both ſides the pith, leaving only the outermoſt circle and the bark on the north-eaſt ſide unpierced. This hole is to be bored ſloping upwards, as large as the largeſt augre will make; and that alſo through and under a large arm near the ground; and thus it will not need any ſtone to keep open the orifice, nor tap to direct the ſap into the receiver. This way the tree will, in a ſhort time, afford liquor enough to brew withal: and with ſome of this ſweet ſap, one buſhel of malt is ſaid to make as good ale as four buſhels of malt with ordinary water. The large maple, called the ſycamore, is ſaid to yield the beſt brewing ſap, its juice being very ſweet and wholeſome. It is affirmed that the liquor which may be drawn from a birch, in the ſpring-time, is equal to the whole weight of the tree, branches, root, and all together.

To preſerve the ſap for brewing, inſolate it by a conſtant expoſure to the ſun, in proper veſſels, till the reſt be gathered and ready, otherwiſe it will contract an acidity. When there is enough, put into it as much very thin cut and hard-toaſted rye-bread, as will ſerve to ferment it; and when it works, take out the bread, and bottle up the liquor. A few cloves in each veſſel that receives the ſap, as it ooſes from the tree, will alſo preſerve it a twelvemonth.

TAPPING, in ſurgery. See the article PARACENTESIS.

TAPTE, a river of the hither India, which runs from eaſt to weſt, through the province of Cambaya, and falls into the indian ocean, a little below Surat.

TAP-TO. See the article TAT-TO.

TAPUYERS and TAPINAMBES, two numerous tribes which the Portugueſe found in Braſil, in South America, when they planted that country.

TAR, a thick, black, unctuous ſubſtance, obtained from old pines and fir-trees, by burning them with a cloſe ſmothering heat: for the method of obtaining which, and the uſe of it in coating and caulking ſhips, *&c.* ſee the article PITCH.

With regard to the medical uſes of tar, it may be obſerved, that it differs from the native reſinous juice of trees, in having received a diſagreeable impreſſion from the fire, and containing a portion of the ſaline and other juices, united with the reſinous and oily; by the mediation of theſe, a part of the terebinthinate oil proves diſſoluble in aqueous liquors, which extract little or nothing from the purer turpentines. See TURPENTINE.

Water impregnated with the more ſoluble parts of tar, proves, in conſequence of this hot pungent oil, warm and ſtimulating: it ſenſibly raiſes the pulſe, and quickens the circulation. By theſe qualities, in cold, languid, phlegmatic habits, it ſtrengthens the ſolids, attenuates viſcid juices, opens obſtructions of the minuter veſſels, and promotes perſpiration and the fluid ſecretions in general; whilſt in hot bilious temperaments, it diſpoſes to inflammation, and aggravates the complaints which it has been employed to remove.

Tar-water has lately been recommended to the world as a certain and ſafe medicine in almoſt all diſeaſes; a ſlow, yet effectual alternative in cachexies, ſcurvies, chlorotic, hyſterical, hypochondriacal, and other chronical complaints; and a ſudden remedy in acute diſtempers, which demand immediate relief, as pleuriſies, peripneumonies, the ſmall-pox, and all kinds of fevers in general. This medicine, though inferior to the character given of it, is, doubtleſs, in many caſes, of conſiderable utility. It ſenſibly raiſes the pulſe, and occaſions ſome conſiderable evacuations, generally by perſpiration or urine, though ſometimes by ſtool or vomit: hence it is ſuppoſed to act by increaſing the vis vitæ, and enabling nature to expel the morbific humours. We ſhall here inſert, from the firſt public recommender of this liquor, Biſhop Berkley, ſome obſervations on the manner of uſing it. Tar-water, when right, is not paler than french, nor deeper than ſpaniſh white wine, and full as clear: if there be not a ſpirit very ſenſibly perceived in drinking, you may conclude the tar-water is not good. It may be drank either cold or warm; in colics, it is judged to be beſt warm. As to the quantity, in common chronical indiſpoſitions, a pint a day may ſuffice, taken on an empty ſtomach, at two or four times, to wit, night and morning, and about two hours after dinner and breakfaſt: more may be taken by ſtrong ſtomachs. But thoſe who labour under great and inveterate maladies, muſt drink a greater quantity, at leaſt a quart

every twenty-four hours: all of this clafs muft have patience and perfeverance in the ufe of this, as well as of all other medicines, which, though fure, muft yet, in the nature of things, be flow in the cure of inveterate and chronical diforders. In acute cafes, and fevers of all kinds, it muft be drank in bed, warm, and in great quantity (the fever ftill enabling the patient to drink), perhaps a pint every hour; which has been known to work furprifing cures. But it works fo quick, and gives fuch fpirits, that the patients often think themfelves cured before the fever hath quite left them.

Ointment of tar is directed in the London Difpenfatory to be made as follows: take of mutton-fuet tried, and tar, each equal weights; melt them together, and ftrain the mixture whilft hot. This compofition, with the addition of half its weight of refin, has long been ufed in the fhops, as a cheap fubftitute to the black bafilicon. See Basilicon.

Tar-pills are directed, in the Edinburgh Difpenfatory, to be prepared as follows: take of tar any quantity at pleafure, mix it with as much elecampane-root as will reduce it into a proper thicknefs for being formed into pills. The powder, here mixed with it, though of no great virtue, is, neverthelefs, a very ufeful addition, not only for procuring it a due confiftence for taking, but likewife, as it divides the glutinous texture of the tar, and thus prevents its adhering to the inteftines, and promotes its folubility in the animal juices. Each dram of the mafs is formed into twelve pills, fix of which are taken every morning and evening, in diforders of the breaft, phthifes, fcurvies, &c. They are far more different in quality from tar-water, than might be at firft expected; that naufeous draught has little heat, pungency, and bitternefs: the water extracting only a fmall quantity of the hot oil, which becomes foluble by the mediation of the acid, produced in the preparation of the tar.

Some have imagined this acid to be the oily fubftance that gives virtue to tar-water; and hence have endeavoured to introduce an acid fpirit, obtained from tar by diftillation; but the effects of this, and all other acids, are directly contrary to thofe experienced, either from tar-water, or tar given in fubftance.

Barbadoes tar is nearly of the confiftence of common tar, and of a reddifh black colour and difagreeable fmell. This bitumen is found in feveral of our american iflands, where it is efteemed, by the inhabitants, of great fervice as a fudorific, and in diforders of the breaft and lungs; though in cafes of this kind, attended with inflammation, it is certainly improper. They alfo apply it externally as a difcutient, for preventing paralytic diforders. Among us it is rarely ufed, and not often to be met with genuine. The college employ it as a menftruum for fulphur, in the barbadoes balfam of fulphur; and direct an oil to be diftilled from it.

TARACON, a city of Spain, in the province of Arragon, fituated on the confines of old Caftile: weft long. 2° 6′, and north lat. 41° 55′.

TARAGON, a city and port-town of Spain, in the province of Catalonia, fituated on the Mediterranean fea, in eaft long. 1° 15′, and north lat. 41° 6′.

TARANTISMUS, in medicine, the difeafe or affection of thofe bit by the tarantula. See the article Tarantula. The patients under this malady are denominated tarantati.

TARANTO, a port-town of Italy, in the kingdom of Naples, fituated on the gulph of Otranto, forty-five miles weft of that city, being the fee of an archbifhop.

TARANTULA, in the hiftory of infects, a fpecies of araneus, with an oval hairy body and thick legs. See Araneus.

This is one of the large fpiders, but is not the very largeft known: its body is three quarters of an inch long, and of the thicknefs of one's little finger: it is ufually of an olive brown, variegated with a dufkier colour; but in this it varies greatly: it is covered with a fhort and foft down, or hairinefs; the points of its forceps are very fine and fharp: this fpecies is a native of Apulia.

As to the effects of the poifon they convey into the wound they make, there feems yet room for much explanation about it. We are told, that in the fummer months, efpecially when the heats are greateft, as in the dog-days, the tarantula, creeping among the corn in the fields, bites the mowers and paffengers: that in the winter it lurks in holes, and is fcarcely feen; and that if it bites then, it is not fo venomous, neither does it induce any ill fymptoms: but in hot weather, according to Dr. Mead, although the pain of its bite is at firft no greater than what is caufed by the fting of a bee,

yet the part is quickly after difcoloured with a livid, black, or yellowifh circle, and raifed to an inflamed fwelling; the patient within a few hours is feized with a violent ficknefs, difficulty of breathing, univerfal faintnefs, and fometimes trembling, with a weaknefs in the head; and on being afked his ailment, with a tremulous voice, and melancholy look, points to his breaft, as if the heart was moft affected: the patient grows by degrees more melancholy, ftupid, and ftrangely timorous, and in a fhort time expires, unlefs mufic is called to his affiftance, which alone, without the help of medicines, is faid to perform the cure, the ufual alexipharmics and cordial medicines, being of no fervice: for at the firft found of the mufical inftrument, although the fick lie as it were in an apoplectic fit, they begin by degrees, to move their hands and feet, till at laft they get up, and fall to dancing, with wonderful vigour at firft, for three or four hours; then they are put to bed, refrefhed from their fweating a fhort time, and repeat their exercife, with the fame vehemence, perceiving no wearinefs or weaknefs from it, but profeffing that they grow ftronger and nimbler the more they dance. At this fport they ufually fpend twelve hours a day; and it continues three or four days, by which time they are freed from all their fymptoms; which, neverthelefs, attack them about the fame time next year; and if they do not take care to prevent this relapfe by mufic, they fall into the jaundice, want of appetite, univerfal weakneffes, and fuch like difeafes, which are every year increafed, if dancing be neglected, till at laft they prove incurable. As mufic is the common cure, fo they who are bitten are pleafed, fome with one fort of it, and fome with another; one is pleafed with a pipe, another with a timbrel, one with a harp, and another with a fiddle; fo that the muficians fometimes make feveral effays before they can accommodate their art to the venom: but this is conftant and certain, notwithftanding this variety, that they all require the quickeft and brifkeft tunes; and are never moved by a flow dull harmony. While the tarantati are dancing, they lofe in a manner the ufe of all their fenfes, are like fo many drunkards, do many ridiculous and foolifh tricks, talk and act obfcenely and rudely, take great pleafure in playing with vine-leaves, with naked fwords, red cloaths, and the like; and, on the other hand, cannot bear the fight of any thing black; fo that if any byftander happen to appear in that colour, he muft immediately withdraw, otherwife they relapfe into their fymptoms with as much violence as ever. Baglivi, who refided in Italy, and probably had good opportunities of informing himfelf with refpect to this infect, has written a treatife exprefly upon the fubject: and moft medicinal writers mention the diftempers arifing from the bite thereof, as a thing certain.

But, notwithftanding all thefe great authorities, there is good reafon to believe the whole ftory fabulous, and a vulgar error; for it is treated as fuch by an italian phyfician, in the Philof. Tranfact. and a great many gentlemen of unqueftionable veracity, who refided at Taranto many months, and during the time in which the bite of a tarantula is faid to be moft pernicious, affirm, that there was not a phyfician in the country, who believed there ever was fuch a diftemper, from fuch a caufe: that among the vulgar there is a tradition, that diftempers attended with very extraordinary circumftances, had been excited by the bite of a tarantula; but that no body ever remembers a fingle inftance; and that there is no other fpider to be found in that country, different from thofe which are common in moft warm countries.

TARANTOLA-FISH, a fpecies of ofmerus, with eleven rays in the pinna ani. See the article OSMERUS.

This fifh is of the fize of the fmelt, or larger; the body is rounded, and the belly flat; its thicknefs is about that of a man's thumb, when its length is feven inches; the belly is white, the head is flatted, and there is a little furrow between the eyes; the opening of the mouth is very large, and the roftrum acute; there is in each jaw a fingle feries of long teeth on each fide of the palate; the back fin has twelve rays, and there is towards the extremity of the back a membranous appendage of the appearance of a fin, but without any rays; the pectoral fins have each thirteen rays.

TARASCON, a port-town of France, in the province of Provence, fituated on the river Rhone, eight miles north of Arles.

TARBES, a city of France, in the province of Gafcony, and territory of Bigorre, fituated on the river Adour: weft long. 3′, and north lat. 43° 16′.

TARE, is an allowance for the outfide pack-

package, that contains such goods as cannot be unpacked without detriment; or for the papers, threads, bands, &c. that inclose or bind any goods imported loose; or, though imported in casks, chests, &c. yet cannot be unpacked and weighed net. Several sorts of goods have their tares ascertained, and those are not to be altered or deviated from, in any case, within the port of London; unless the merchant thinking himself, or the officers of the crown, to be prejudiced by such tares, shall desire that the goods may be unpacked, and the net-weight taken; which may be done either by weighing the goods in each respective cask, &c. net; or (as is practised in east-india goods particularly) by picking out several casks, &c. of each size, and making an average, compute the rest accordingly. But this must not be done without the consent of two surveyors, attested by their hands in the landwaiter's books; and in the out-ports, not without the consent of the collector and surveyor. And as to those goods which have not their tares ascertained, two surveyors in London, and the collector and surveyor in the out-ports, are to adjust and allow the same, in like manner. Sometimes the casks, &c. are weighed beyond sea, before the goods are put in; and the weight of each respective cask, &c. marked thereon (as is usual for most goods imported from the british plantations), or else inserted in the merchant's invoice; in which case, if the real invoice be produced, and the officers have satisfied themselves (by unpacking and weighing some of them) that those weights are just and true, they do then, after having reduced them to british weight, esteem them to be the real tares, and pass them accordingly. But the unpacking goods, and taking the net-weight, being supposed the justest method, both for the crown and merchant, it is usually practised in the port of London, in all cases where it can be done with conveniency, and without detriment to the goods.

As the knowledge of tare is of great importance in commerce, we shall here add an alphabetical table of some principal articles in trade, with their tares, as allowed in the customhouse of London.

Alum in casks, tare 12 per cent.
Antimony in casks, 6 ℔. per cent.
Ashes, called pot-ashes, 10 per cent.
Ashes, called weed ashes, 8 ℔. per sack.
Assa fœtida, in baskets, about ¼ Cwt. 3 ℔. per basket.
Barilla in double serons, 36 ℔. per seron.
Beads, called coral-beads, in cases, if covered with rags, 3 per cent. for strings, paper, and rags; but if not covered with rags, then only 2 per cent.
Brimstone in casks, 8 ℔. per cent.
Bugle, great, in casks, 3 per cent.
Camphor in tubs about ½ or ¾ Cwt. tare 18 ℔.
Canary-seeds in barrels of about 2¼ Cwt. at 30 ℔. each.
Capers in casks, tare one third.
Cochineal in chests, covered with skins, containing about 1¾ Cwt. tare 50 lb.
Ditto in barrels, about 1½ Cwt. tare 36 lb.
Ditto in bales of about 200 lb. each 18 lb. per bale.
Ditto in casks of about 250 lb. each, 42 lb. each.
Coffee in bales, from India, of about 2¼ Cwt. 18 lb. per bale.
Ditto in bales from Turky, of about 3 Cwt. 15 lb. per bale.
Copper-ore in casks of near 2 Cwt. each, 21 lb. per cask.
Copperas-green, in casks of about 10½ Cwt. 10 per cent.
Figs in barrels, 14 lb. per cent.
Flax, undressed, in bales or bags about 4¼ Cwt. 6 lb. each.
Galls, from Aleppo and Smyrna, in double bags, 7 lb. each.
Gum-arabic in sacks about 3 Cwt. 10 lb. per sack.
Hemp in fats, 14 lb. per cent.
Hops in bags, 4 lb. per cent.
Indigo in chests, covered with skins, about 1¼ Cwt. 48 lb.
Ditto in bales, with skins, about 1½ Cwt. tare 16 lb.
Iron, old bushel, in casks about 13 Cwt. 107 lb. each.
Madder, great and small, single and double bags, tare 28 lb.
Pearl-barley in casks of about 4½ Cwt. 45 lb. per cask.
Pepper, long, from India, in bags about 1 Cwt. 8 lb. per bag.
Pitch, called burgundy-pitch, in stands about 2¼ Cwt. tare 56 lb.
Prunelloes in boxes about 14 lb. 3 lb. per box.
Rice in barrels about 4 Cwt. tare as on the casks.
Sago, from India, in bags about 94 lb. 3 lb. each.



Salt-

Salt-petre in caſks, 12 lb. per cent.
Smalts, or powder-blue, in caſks, about 4 Cwt. 10 per cent.
Soap, called caſtile ſoap, in double ſerons about 3 Cwt. 30 lb.
Tallow, from Ruſſia and Ireland, in caſks, 12 lb. per cent.
Turpentine in caſks, tare one fifth part.
Wax, bees-wax in caſks about 10 Cwt. 84 lb. per caſk.
Spaniſh wool in bales, for cloth, about 2 Cwt. tare 28 lb.

TARENTAIS DUTCHY, the ſouth diviſion of Savoy, having Piedmont on the ſouth-eaſt, and Savoy proper on the north-weſt: ſubject to the king of Sardinia.

TARGET, a kind of ſhield or weapon of defence made uſe of by the antients.

TARGOROD, a town of Turky in Europe, in the province of Moldavia, fifty miles ſouth-weſt of Jazy: eaſt long. 26° 30′, and north lat. 47°.

TARGUM, a name whereby the Jews call the chaldee paraphraſes, or expoſitions, of the Old Teſtament, in the chaldee language. After the captivity, the jewiſh doctors, in order to make the people underſtand the holy ſcripture, which was read in hebrew in their ſynagogues, were obliged to explain the law to them in a language they underſtood, which was the chaldean, or that uſed in Aſſyria. The targums now remaining, were compoſed by different perſons, upon different parts of ſcripture, and are eight in number.

TARIF, or TARIFF, a table or catalogue, containing the names of different ſorts of merchandize, with the duties to be paid, as ſettled by authority, amongſt trading nations.

TARIFFA, a port-town of Spain, in the province of Andaluſia, ſituated at the entrance of the ſtreights of Gibraltar, eighteen miles weſt of Gibraltar, and twenty-four miles north of Tangier: weſt long. 6° 15′, and north lat. 36°.

TARKU, a port-town of Perſia, in the province of Chirvan and territory of Dagiſtan, ſituated on the weſt ſide of the Caſpian ſea, three hundred miles ſouth of Aſtracan: eaſt long. 51°, north lat. 42°.

TARO, a river of Italy, which riſes in the mountains on the confines of Genoa, and runs north-eaſt thro' the dutchy of Parma, falling into the Po below Cremona.

TARODANT, a city of Morocco, in Africa, in the territory of Sus, ſituated near the Atlantic ocean, one hundred and twenty miles ſouth of the city of Morocco: weſt long. 10°, and north lat. 30°.

TARPAULIN, a piece of canvas, well tarred over, to keep off the rain from any place. The term is alſo often applied in a burleſque ſenſe to a perſon that has been all his life bred to the ſea.

TARPEIAN, in roman antiquity, an appellation given to a ſteep rock in Rome; whence, by the law of the twelve tables, thoſe guilty of certain crimes were precipitated.

TARPEIAN GAMES, the ſame with thoſe otherwiſe called capitoline. See the article CAPITOLINE GAMES.

TARRACE, or TERRACE, a kind of plaſter or mortar. See TERRACE.

TARSO, in the glaſs-trade, a white kind of ſtone, uſed inſtead of ſand, for the fineſt cryſtal glaſs. See GLASS.

TARSUS, in anatomy, the ſpace between the bones of the leg and the metatarſus, wherein are contained ſeven bones, *viz.* the aſtragalus, calcaneum, os naviculare, os cuboides, and the three oſſa cuneiformia. See ASTRAGALUS, *&c.*

If any of theſe bones happens to be luxated, they ſhould be ſpeedily replaced; for which purpoſe the foot ſhould be extended on an even table, and the ſurgeon is to replace the diſlocated bones with the preſſure of the palms of his hands, adjuſting them alſo with his fingers, where need requires. Compreſſes, dipped in warm ſpirit of wine, are then to be laid on the part, and both theſe and the reduced bones ſecured in their places, by means of the proper bandages: the patient is then to be enjoined to remain in bed, till the new ſet bones have acquired a ſufficient ſtrength.

TARSUS is alſo uſed by ſome for the cartilages which terminate the palpebræ, or eyelids, and from which the cilia or hairs ariſe. See the article EYE.

TARSUS, now Teraſſo, once the capital of Cilicia, in the leſſer Aſia, now a province of Aſiatic-Turky, is ſituated on the north ſide of the Levant-Sea: eaſt long. 35°, north lat. 37°.

TARTANE, in naval architecture, a kind of bark, uſed in the Mediterranean, for fiſhing and carriage. It has only a main-maſt and a mizzen; its ſails are triangular; and when a ſquare ſail is put up, it is called a ſail of fortune.

TARTAR, in natural hiſtory and pharmacy, a hard and almoſt ſtony ſeparation from a vegetable juice, after fermentation. See FERMENTATION.

The common tartar is the produce of wine, being found in large maſſes, adhering

hering to the bottoms and fides of cafks, in which that liquor has been long kept. We meet with it in large maffes of an irregular figure, and more or lefs denfe texture, without fmell, and of a fubacid tafte.

The common crude tartar is of two kinds, the white and the red; this difference of colour, being owing to that of the wine they are produced from, is of little confequence in itfelf, but it is an indication of more effential differences in the matter. The white tartar is much more pure and clean than the red, and is, though equally hard, confiderably lefs heavy. We have this principally from Germany, where it is, at times, cleared off from the fides of very large veffels, in which they keep their white wines for many years. The red tartar is brought in large quantities from Italy, and fome parts of France. The white tartar is to be chofen for medicinal ufe, and particularly fuch as is of a compact texture, not fpongy or cavernous, when broken, and free from dirt, or other foulneffes, and fuch as has a fort of cryftallizations on its furface. Tartar is, properly fpeaking, the effential falt of the grape. Tartar contains a large portion of acid falt, and of an oil, in part thin and limpid, in part thick and coarfe. It affords a fmall portion of a volatile alkali falt in diftillation, and the refiduum yields a very large proportion of fixed alkali. It is to be obferved, that both thefe alkalies feem, in fome degree, creatures of the fire; for neither of them manifeft themfelves either by their tafte or qualities in the tartar, any more than in many other fubftances, which yet afford much of them by analyfis, till they have felt the operation of the fire.

Tartar diffolves in boiling-water, but with great difficulty in cold; and even when purified, and brought to the ftate of what we call cryftal, or cream of tartar, it retains the fame quality. Tartar is fcarce ever given internally in its crude ftate. The preparations now in ufe are thefe.

*Cryftals of* TARTAR. Powder a quantity of white tartar, and boil it in a fufficient portion of water till it be in a great part diffolved, the foulnefs only remaining behind. Pour this decoction, while hot, through a flannel-bag, let it ftand till cold, and there will be cryftals formed at the fides of the veffel; thefe are the cryftals of tartar. They may be diffolved by boiling a fecond time, and fet to fhoot again, and by this means they will be rendered the more pure. The French, who prepare great quantities of thefe cryftals about Montpelier, firft diffolve a fmall quantity of white earth of the nature of chalk, in the water in which they are to be boiled, for the fecond folution. This earth renders the water milky, but the cryftals fhoot perfectly clear in it, and whatever foulnefs they carried with them at their firft fhooting, will be, by this means, more perfectly feparated from them.

It was formerly a cuftom to feparate firft the falt which fhot to the top of the liquor in form of a thin fkin or film, and this was fuppofed purer than the reft, and called cream of tartar; but it is wholly the fame with the cryftals that fhoot to the fides of the veffel, and nobody now trouble themfelves to keep it feparate.

The cryftals of tartar, or, as we commonly exprefs it, cream of tartar, is a gentle purge; it attenuates and refolves tough humors, and is good againft obftructions of the vifcera, and in cachectic complaints.

*Fixed falt of* TARTAR. Take any quantity of tartar at pleafure, put it into a crucible, and calcine it for eight hours in an open fire; then pour boiling water on it, and fet it over the fire till all the falt be diffolved. Filtre the folution, and evaporate it to a drynefs in a fand-heat; there will remain, at the bottom of the veffel, a white fixed alkaline falt. If it is not fo pure as it ought to be, diffolve it in fair-water; filtre the folution, and evaporate it to a drynefs as before; after which it may be calcined for half an hour in a crucible; it will then be perfectly pure, and muft be kept in a phial clofe ftopped, for it eafily melts if the air comes to it.

If this falt be expofed to a damp air, as in a vault, or other fuch place, in a flat earthen veffel, it runs into a heavy liquor, which is to be filtred, to feparate it from any foulnefs it may have accidentally contracted, and is the oleum tartari per deliquium.

The fixed falt of tartar is very acrid and cauftic; fome attribute great virtues to it, as a diuretic; and our apothecaries too frequently ufe it in the place of falt of wormwood. They, indeed, buy it as fuch; and what is yet more unfair in the feller, is, what he calls by either of thefe names of falt of tartar or falt of wormwood, as it is more or lefs purified, is often not truly either, but is prepared from the com-

common ruffia pot-afh, diffolved and purified. This fixed alkali is of great ufe in opening the bodies of refinous and fulphureous fubjects, and making them yield a ftronger tincture to fpirit of wine, or water, than they otherwife would do. It is often mixed alfo with purges to quicken the operation. Caution ought to be taken, when it is given internally, either that it be firft diffolved by an acid, as in the faline draughts; or elfe blended with a large quantity of liquor, to prevent its proving too acrid as it paffes the œfophagus.

*Tincture of falt of* TARTAR. Put a quantity of falt of tartar into a good crucible; fet it in an open fire, and calcine it for fome hours, raifing the fire, at laft, to fuch a degree as to make the falt ready to melt; then pour it into a clean marble mortar, grind it fome time, and while yet hot, put it into a matrafs heated beforehand; pour a quart of rectified fpirits of wine on four ounces of this calcined falt, and let it ftand in a fand-heat three or four days, in which time, if the procefs have been rightly managed, the fpirit will become of a ftrong yellowifh colour, and is then to be filtred off for ufe.

People who make this tincture, find it difficult to give the fpirit the true colour. This tincture is attenuant and refolvent, given from ten to thirty drops: it is alfo of great ufe in extracting the tinctures of vegetable and mineral fubftances, which would not impart any colour to fimple fpirit of wine.

*Foliated* TARTAR, or *regenerated* TARTAR. Take any quantity of dry falt of tartar powdered, put it in a large glafs veffel, and pour thereon, by degrees, as much fpirit of vinegar as will faturate the falt; filtre the fluid, and evaporate it over a gentle fire to drinefs, taking great care that the matter does not contract any empyreuma. On the falt which remains after this evaporation, pour out as much frefh vinegar as will again faturate it; then filtre the fluid, and carefully dry it by evaporation.

This falt has a febrifuge and deobftruent quality. The dofe may be from ten grains to one fcruple, to be taken in a glafs of water, and repeated every fourth or fixth hour, according to the exigence of the cafe.

*Emetic* TARTAR, a preparation of antimony with tartar. See ANTIMONY.

*Soluble* TARTAR is thus made; Diffolve a pound of fixed alkaline falt in a gallon of boiling-water, and gradually throw in cryftals of tartar as long as a frefh addition thereof raifes any effervefcence, which generally ceafes before three pounds of the cryftals have been ufed: then filtre the liquor; and, after due evaporation, fet it by to cryftallize. This falt has been long efteemed both as a medicine and a menftruum: it is aperient, attenuates vifcid juices, promotes the urinary fecretion, and gently loofens the belly: the dofe is from ten grains to a dram or two, or more. It is alfo ufed as an addition to the refinous purgatives, as it promotes their action, and at the fame time prevents their griping quality.

*Vitriolated* TARTAR is ordered, by the College of London phyficians, to be made thus: Diffolve eight ounces of green vitriol in four pints of boiling water; and while the liquor continues boiling, throw into it falt of tartar, or any other alkaline falt, till no effervefcence arifes upon throwing in a frefh addition, which generally happens when four ounces, or a little more of the falt have been ufed: filtre the liquor through paper, and after due evaporation fet it by to cryftallize.

Vitriolated tartar is aperient, exhibited in fmall dofes of a fcruple, or half a dram, attenuates vifcid juices, and promotes the fluid fecretion. In larger dofes it proves a mild and fafe cathartic.

TARTARY, a vaft country in the northern parts of Afia, bounded by Siberia on the north and weft: this is called Great-Tartary. The Tartars who lie fouth of Mofcovy and Siberia, are thofe of Aftracan, Circaffia, and Dagiftan, fituated north-weft of the Cafpian-fea: the calmuc Tartars, who lie between Siberia and the Cafpian-fea: the ufbec Tartars and Moguls, who lie north of Perfia and India: and, laftly, thofe of Tibet, who lie north-weft of China.

TASSEL, a fort of pendant ornament at the corners of a cufhion, or the like.

In building, taffels denote thofe pieces of board that lie under the ends of the mantle trees.

TASSO, or THASSUS, a fmall ifland in the Archipelago, thirty miles north of Lemnos.

TASTE, in phyfiology, a peculiar fenfation excited by means of the organs of tafte, *viz.* the papillæ on the tongue. See the article TONGUE.

The taftes of bodies depend on a certain determinate magnitude of their particles, adapted

adapted to excite different ſenſations by means of the papillæ of the tongue.

Savours, which are the objects of the taſte in general, proceed chiefly from the ſaline parts, which are found in all matters, whether animal or vegetable, which we take either as food or phyſic. Theſe little angular pungent bodies are fitter than others to penetrate even to the immediate organ, and to make themſelves perceived there: we may judge of them by putting a grain of pure ſalt, of any kind whatever, upon the tongue, where it will make a very ſtrong impreſſion; and their analyſis diſcovers, that, of all mixed bodies, thoſe that affect the organ moſt, are ſuch as abound moſt in ſalts. See the article SALT.

The moſt ſimple ſavours, and upon which men are more generally agreed, are thoſe wherein the ſalts are the leaſt mitigated by the mixture of other matters. Every one knows what is meant by ſalt, ſour, ſweet, bitter, harſh, &c. theſe different ſenſations are ſo remarkable that they are preſently diſtinguiſhed: they are, as it were, the baſis of all others, which become ſo much the more difficult to deſcribe and expreſs, the more they recede from their primary ſimplicity. The bitterneſs of coffee, for example, corrected by the ſweetneſs of ſugar, produces a mixed ſenſation; the juice of fruits, mingled with ſpirit of wine, takes a new taſte: the taſte of victuals changes almoſt entirely, and is diſguiſed a thouſand different ways, by that infinite number of preparations and mixtures, which the preſent age has rendered an important art.

TASTE is alſo uſed, in a figurative ſenſe, for the judgment and diſcernment of the mind.

We conſtantly hear talk of good and bad taſte, without well underſtanding the meaning of theſe terms: in effect, a good taſte ſeems, at bottom, to be little elſe but right reaſon, which we otherwiſe expreſs by the word judgment. Mad. Scudery, and Mad. Dacier, call good taſte a harmony between the mind and reaſon; and according as that harmony is more or leſs juſt, the perſon has more or leſs of this taſte.

TATA, or SINDA, the capital of a province of the ſame name in the hither India, in Aſia, ſituated at the mouth of the Indus: eaſt longitude 68°, north latitude 25° 40′.

TATIANITES, in church-hiſtory, chriſtian heretics in the ſecond century; ſo called from their leader Tatian, a diſciple of St. Juſtin.

This hereſiarch took from Valentinus the fable of the Æons, and from Marcion the doctrine of two principles. But what particularly diſtinguiſhed his followers was, their condemning of marriage, and forbidding the eating of fleſh or drinking of wine.

TATTERSHALL, a market-town of Lincolnſhire, eighteen miles ſouth-eaſt of Lincoln.

TAT-TOO, q. d. TAP-TO, a beat of a drum at night, to advertiſe the ſoldiers to retreat or repair to their quarters in their garriſon, or to their tents in a camp.

TAU, or TAW, in heraldry, an ordinary in figure of a T, ſuppoſed to repreſent St. Andrew's croſs, or a croſs potence, the top part cut off. See CROSS.

TAVASTUS, the capital of the province of Tavaſtia, in the territory of Finland, in Sweden, ſituated eighty-four miles north-eaſt of Abo; eaſt long. 24°, north lat. 61° 20′.

TAUBER, a river of Germany, which, riſing in Franconia, paſſes by Mergentheim, and falls into the river Maine at Wertheim.

TAVERNA, a town of the further Calabria, ſituated ſeventy miles north-eaſt of Reggio.

TAUGHT, or TAU'T, in the ſea-language, ſignifies the ſame as ſtiff, or faſt: thus, to ſet taught the ſhrouds, or ſtays, is to make them more tight and ſtiff.

TAVIRA, a city of Algarva, in Portugal: weſt long. 8° 32′, north lat. 37°.

TAVISTOCK, a borough of Devonſhire, thirty two miles weſt of Exeter.

It ſends two members to parliament, and gives the title of marquis to the noble family of Ruſſels, dukes of Bedford.

TAUNT, or TAUNT-MASTED, is ſaid of a ſhip whoſe maſts are too tall for her.

TAUNTON, a borough of Somerſetſhire, twenty miles ſouth-weſt of Wells.

It ſends two members to parliament.

TAURILIA, in roman antiquity, certain religious games, celebrated to appeaſe the infernal gods.

TAURIS, or TABRIS, a city of Perſia, four hundred miles north of Iſpahan: eaſt long. 46° 30′, north lat. 38° 20′.

TAURUS, the BULL, in zoology. See the article BULL.

TAURUS, in aſtronomy, one of the twelve ſigns of the zodiac, the ſecond in order,

 conſiſt-

consisting of forty-four stars, according to Ptolomy; of forty-one, according to Tycho; and of no less than one hundred and thirty-five, according to the britannic catalogue. See the article ZODIAC.

TAURUS is also the name of a ridge of mountains which run through the lesser Asia, from west to east.

TAUTOLOGY, in rhetoric, a needless repetition of the same thing in different words.

TAW, or TAU. See the article TAU.

TAWING, the art of dressing skins in white, so as to be fit for divers manufactures, particularly gloves, &c.

All skins may be tawed; but those chiefly used for this purpose are lambs, sheep, kids, and goat-skins.

The method of tawning is this: Having cleared the skins of wool or hair, by means of lime, &c. as described under the article SHAMMY, they are laid in a large vat of wood or stone, set on the ground full of water, in which quick-lime has been slaked, wherein they are allowed to lie a month or six weeks, according as the weather is more or less hot, or as the skins are required to be more or less soft and pliant.

While they are in the vat, the water and lime is changed twice, and the skins are taken out and put in again every day; and when they are taken out for the last time, they are laid all night to soak in a running water, to get out the greatest part of the lime; and in the morning are laid together by sixes one upon another, upon the wooden leg (and are scraped stoutly one after another, to get the flesh off from the fleshy side, with a cutting two handled instrument called a knife, and then they cut off the legs, if they are not cut off before) and other superfluous parts about the extremes. Then they are laid in a vat or pit with a little water, where they are fulled with wooden pestles for the space of a quarter of an hour, and then the vat is filled up with water, and they are rinsed in it.

In the next place, they are thrown on a clean pavement to drain, and afterwards cast into a fresh pit of water, out of which they rinse them well, and are laid again on the wooden leg, six at a time, with the hair-side outermost, over which they rub a kind of whetstone very briskly to soften and fit them to receive four or five more preparations, given them on the leg, both on the flesh side and the hair-side, with the knife, after the manner above mentioned.

After this they are put into a pit of water and wheaten-bran, and stirred about in it with wooden poles, till the bran is perceived to stick to them, and then they are left; as they rise of themselves to the top of the water by a kind of fermentation, they are plunged down again to the bottom, and at the same time fire is set to the liquor, which takes as easily as if it were brandy, but goes out the moment the skins are all covered.

They repeat this operation as often as the skins rise above the water; and when they have done rising they take them out, lay them on the wooden leg, the fleshy side outwards, and pass the knife over them to scrape off the bran.

Having thus cleared them of the bran, they lay the skins in a large basket, and load them with huge stones to promote their draining: and when they have drained sufficiently, they give them their feeding, which is performed after the manner following:

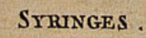
For one hundred of large sheep-skins, and for smaller in proportion, they take eight pounds of alum, and three of sea-salt, and melt the whole with water in a vessel over the fire, pouring the dissolution out, while yet luke-warm, into a kind of trough, in which is twenty pounds of the finest wheat flower, with the yolks of eight dozen of eggs; of all which is formed a kind of paste, a little thicker than children's pap; which, when done, is put into another vessel, to be used in the following manner:

They pour a quantity of hot water into the trough in which the paste was prepared, mixing two spoonfuls of the paste with it; to do which they use a wooden spoon, which contains just as much as is required for a dozen of skins: and when the whole is well diluted, two dozen of the skins are plunged into it; but they take care that the water be not too hot, which would spoil the paste and burn the skins.

After they have lain some time in the trough, they take them out, one after another, with the hand, and stretch them out; this they do twice; and after they have given them all their paste, they put them into tubs, and there full them afresh with wooden pestles.

Then they put them into a vat, where they are suffered to lie for five or six days,

or




*N.º 7.*

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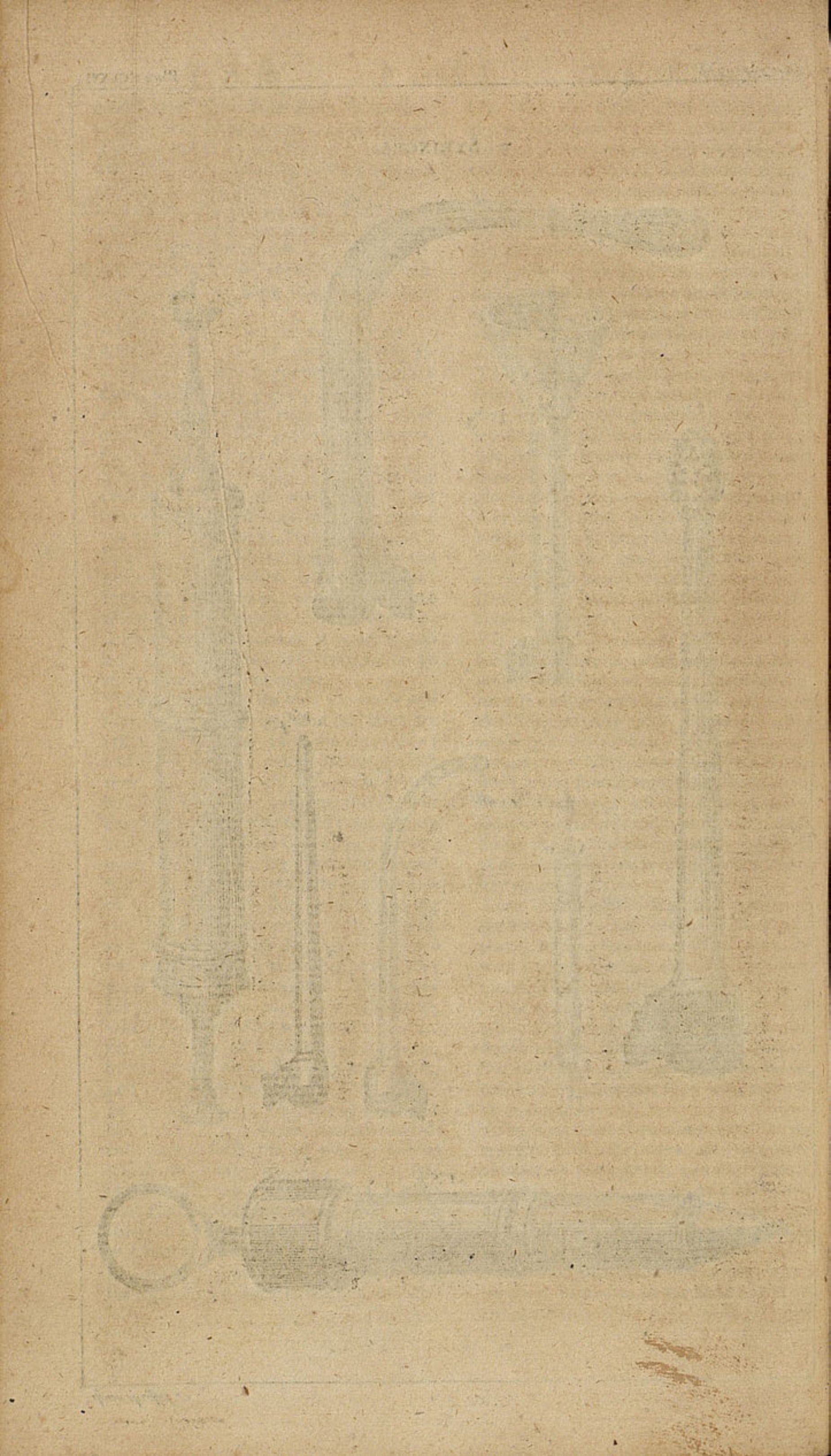
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*J. Jefferys sculp.*



or more; then they take them out in fair weather, and hang them out to dry on cords or racks, and the quicker they are dried the better; for if they be too long a drying, the falt and alum within them are apt to make them rife in a grain, which is an effential fault in this kind of dreffing.

When the fkins are dry, they are made up into bundles, and juft dipt in fair water, and taken out and drained; and being thrown into an empty tub, and after having lain fome time are taken out and trampled under foot.

Then they draw them over a flat iron-inftrument, the top of which is round like a battledore, and the bottom fixed into a wooden block, to ftretch and open them; and having been opened, they are hung in the air upon cords to dry: and being dry, they are opened a fecond time, by paffing them again over the fame inftrument.

In the laft place they are laid on a table, pulled out, and laid fmooth, and are then fit for fale.

After the fame manner are dreffed horfes, cows, calves-fkins, &c. for the fadlers, harnefs-makers, &c. as alfo thofe of dogs, wolves, bears, &c. except that in thefe they omit ufing the pafte, falt and alum-water being fufficient.

TAX, a tribute rated upon every town, which formerly was wont to be paid annually into the King's-exchequer, but now not without confent of parliament; it differs from a fubfidy in this, that it is always certain, as fet down in the exchequer-book, and in general levied of every town, and not particularly of every man, &c. The antient way of levying taxes was by tenths and fifteenths, afterwards by fubfidies and royal aids, and at length by a pound rate; the former of thefe were all upon the perfon and perfonal eftate, but the laft upon lands and rents. In the late reigns, a land-tax has been annually granted of two, three, or four fhillings in the pound, according to prefent exigencies, to be levied by commiffioners on the feveral counties, cities, towns, &c. And in refpect of this tax, the tenants, or occupiers, of the land are to be charged or affeffed, and the fame deducted out of the rent due to the landlords: and if any perfons refufe to pay what they are rated, the collectors in every parifh may levy it by diftrefs and fale of their goods; but in cafe they are over-rated, they may be relieved by an appeal to the commiffioners, who have power to charge the overplus on others, as they fhall fee caufe; or where there appears to be a deficiency, they may make a re-affeffment, &c. See TRIBUTE, &c.

TAXIS, a term ufed by Vitruvius for what is now called ordonnance, being that which gives every part of a building its juft dimenfions with refpect to its ufes. See the article ORDONNANCE.

TAXUS, the YEW-TREE, in botany, a genus of the dioecia-monodelphia clafs of plants, without any corolla. The calyx of the male flower is compofed of three leaves: the ftamina are numerous: the feed is fingle, and furrounded by an undivided baccated calyx: the tree is very flow in growing, but there are many very large ones upon fome barren cold foils in divers parts of England: the timber is much efteemed for many ufes.

TAXUS, in zoology, a name ufed by fome authors for the meles, or badger. See the article MELES.

TAY, a river of Scotland, rifing from the loch, or lake, of Tay, in Broadalbin, and running eaft through Athol: it afterwards turns fouth-eaft, and dividing the counties of Perth and Angus from Strathern and Fife, falls into the frith of Tay.

TAYVEN, a city of China, in Afia, in the province of Xanfi, two hundred and forty miles fouth-weft of Pekin: eaft long. 108°, north lat. 38° 30′.

TCHELMINAR. See CHILMINAR.

TEA, *thea*, in botany, a genus of the polyandria-monogynia clafs of plants, the corolla of which confifts of fix large, roundifh, hollow, equal petals: the fruit is a capfule, formed of three globular bodies growing together: it contains three cells, in each of which is a fingle feed, globofe, and internally angulated. This fhrub grows to five or fix feet high, and is very ramofe: its root is fpreading and fibrous: the leaves are about an inch long, near half an inch broad, ferrated, and terminating in a point. The traders in tea diftinguifh a vaft many kinds of it, as they differ in colour, flavour, and the fize of the leaf. They are all, however, the leaves of the fame tree, only differing according to the feafons when they are gathered, and the manner of drying. To enumerate the feveral fubdiftinctions were endlefs; the general divifion is into three kinds, the ordinary green-tea, the finer green, and the bohea; to one or other of which all

the

the other kinds may be referred. The common green-tea has fomewhat fmall and crumpled leaves, much convoluted, and clofely folded together in the drying. Its colour is a dufky-green, its tafte fub-aftringent, and its fmell agreeable. It gives the water a ftrong yellowifh-green colour. The fine green has larger leaves, lefs rumpled and convoluted in the drying, and more lax in their folds; it is of a paler colour, approaching to the blue-green, of an extremely pleafant fmell, and has a more aftringent, yet more agreeable, tafte than the former. It gives a pale-green colour to water. To this kind are to be referred all the higher priced green teas, the hyfon, imperial, &c. The bohea confifts of much fmaller leaves than either of the other, and thofe more crumpled and clofely folded than in either. It is of a darker colour than the other, often blackifh, and is of the fmell and tafte of the others, but with a mixed fweetnefs and aftringency. The green teas have all fomewhat of the violet-flavour; the bohea has naturally fomewhat of the rofe-fmell. The leaves when gathered are dried with great caution, partly by the help of heat, partly by the air, and when thoroughly prepared will keep a long time frefh and good. Every parcel, when dried, though gathered promifcuoufly, is feparated, according to the largenefs and fmallnefs of the leaves, into three or four different kinds, each of which is of a different price, and has its different name. The bohea tea is gathered before the leaves are perfectly opened, and is made to undergo a greater degree of heat in the curing, to which its colour and peculiar flavour is in a great meafure owing.

Tea, moderately and properly taken, acts as a gentle aftringent and corroborative: it ftrengthens the ftomach and bowels, and is good againft naufeas, indigeftions, and diarrhœas. It acts alfo as a diuretic and diaphoretic; but its virtues in thefe particulars are in a great meafure to be attributed to the quantity of warm water drank on the occafion. The good qualities of tea do not prevent its often doing harm. Even in China, where the virtues of tea are fo vaftly extolled, the people who drink it to great excefs are often thrown into diabetes, and die emaciated by it.

Tea, imported from India, for every 100 pound, grofs value, at the fale, pays a duty of 18 l. 18 s. $7\frac{66\frac{1}{2}}{100}$d. And the inland duty for every pound weight, is one fhilling; and for every hundred pounds, grofs value, at the fale, twenty-five pounds.

TEAL, or Teale, in ornithology, the anas, with a green fpot on the wing, and a white line both above and below the eyes; being the fmalleft, moft elegant and valuable of all the duck-kind. See the articles Anas and Circia.

TEARS, *lachryma*, a lymph or aqueous humour, which is fubtile, limpid, and a little faltifh: it is feparated from the arterial blood by the lachrymal glands, and fmall glandulous grains on the infide of the eye-lids. This fluid ferves to moiften and deterge the eyes and the eye-lids, after which it tends to the internal angle of the eye, and is abforbed by the puncta lachrymalia, and conveyed to the lachrymal bag, from whence it goes into the nofe, by the nafal canal. See the article Lachrymalia.

TEASEL, or Teazel, in botany. See the article Dipsacus.

TEBETH, the tenth month of the jewifh ecclefiaftical year, and fourth of the civil. It anfwers to our month of December.

TECKLENBURG, a city of Germany, in the circle of Weftphalia, capital of a county of the fame name, thirteen miles fouth-weft of Ofnabrug, fubject to its own count: eaft long. 7° 20′, north lat. 52° 21′.

TECHNICAL expreffes fomewhat relating to arts or fciences: in this fenfe we fay technical terms. It is alfo particularly applied to a kind of verfes wherein are contained the rules or precepts of any art, thus digefted to help the memory to retain them; an example whereof may be feen in the article Memory.

TECUM duces. See Duces.

TE deum, the name of a celebrated hymn, ufed in the chriftian church, and fo called becaufe it begins with thefe words, *Te Deum laudamus*; We praife thee, O God. It is fung in the romifh church, with great pomp and folemnity, upon the gaining of a victory, or other happy event.

TEETH. See the article Tooth.

TEES, a river which rifes on the confines of Cumberland, and running eaftward divides the county of Durham from Yorkfhire, and falls into the German fea below Stockton.

TEFLIS, the capital of persian Georgia, in Asia, situated on the river Kur, or Cyrus, three hundred miles north of Tauris, and as many south of Astracan: east long. 47° 20′, north lat. 43°.

TEGAPATAN, a port-town of the hither India, in Asia, near Cape Comorin, eighty miles south of Cochin, and a hundred and sixty north-west of Columbo in Ceylon: east long. 76°, north lat. 8°.

TEGUMENT, or INTEGUMENT, any thing that surrounds or covers another. The common teguments of the human body are the cutis, cuticle, and fat. See the article CUTIS, &c.

TEHAMA, one of the divisions of Arabia felix, in Asia, situated on the Red-sea, between the provinces of Mecca and Hadramut.

TEINTS and SEMI-TEINTS, in painting, denotes the several colours used in a picture, considered as more or less high, bright, deep, thin or weakened, and diminished, &c. to give the proper relievo, softness, or distance, &c. of the several objects.

TEIRCE, or TIERCE. See TIERCE.

TEISSE, or TEYS, a river of Hungary, which rises in the Carpathian mountains, and running from east to west, passes by Tockay; then turning south, passes by Zolnock and Segedin, and having joined the river Merish, falls into the Danube, opposite to Salankamen.

TEKUPHÆ, or THEKUPHÆ, in the jewish chronology, are the times wherein the sun proceeds from one cardinal point to the next.

TELAMON, or ATLAS, a name given to those figures or half figures of men so commonly used instead of columns or pilasters, to support any member in architecture, as a balcony, or the like.

TELAUGIA, in natural history, a genus of scrupi, of a glittering appearance, usually containing flakes of talc, and emulating the structure of the granites. See the article SCRUPI.

Of this genus Dr. Hill reckons no less than twelve species. 1. The hard, shining, black, and white telaugium. 2. The hard, shining, red, and white telaugium. 3. The red telaugium, variegated with white and black. 4. The hard, heavy telaugium, of a greyish black, variegated with white. 5. The brownish, red telaugium, variegated with white and yellowish. 6. The reddish white telaugium, variegated with black and a gold colour. 7. The hard, white telaugium, variegated with brown. 8. The bluish, white, brittle telaugium. 9. The brown, friable telaugium, variegated with yellow. 10. The hard, purplish, brown telaugium, variegated with white and yellow. 11. The heavy, red telaugium, variegated with black and white. And, 12. The hard, bluish, green telaugium, variegated with white.

TELEPHIUM, in botany, a genus of the pentandria-trigynia class of plants, the corolla of which consists of five erect, oblong, obtuse petals, narrowest at the base; the fruit is a short triquetrous capsule, formed of three valves, and having only one cell; the receptacle is free, and of about half the length of the capsule; the seeds are numerous and roundish.

TELESCOPE, an optical instrument consisting of several lenses, by means of which remote objects are so magnified as to appear nigh at hand. See LENS.

That the telescope is of a modern invention is most certain; neither does it appear that microscopes, or optic glasses of any kind, were known to the antients. It is contended, that Alexander de Spina, a native of Pisa, was the first that made the use of glasses known to the world; but our countryman, friar Bacon, who died twenty-one years before him, was, in all probability, acquainted with them first; for he wrote a book of perspective, in which he plainly shews that he did not only understand the nature of convex and concave glasses, but the use of them when combined in telescopes; though he no where, in that treatise, discovers the manner in which they are to be put together.

The telescope, with the concave eye-glass, was first invented by a mechanic of Middleburgh in Zealand, called Z. Johannides, about the year 1590, tho' J. Lipperhoy, another Dutchman, is candidate for the same discovery. From whence this sort of telescope is called tubus batavus.

Franciscus Fontana, a Neapolitan, contends, that he was the first contriver of the telescope composed of two convex glasses, which is now the common astronomical telescope; and Rheita pretends to be the first that rendered that telescope fit for terrestrial uses, by adding two eye-glasses to it.

The telescope is of two sorts, *viz.* dioptric, or refracting; or cata-dioptric, by reflection and refraction conjointly.

*Dioptric or refracting* TELESCOPE consists of an object-glass $xz$ (plate CCLXXI. fig. 1.) by which the image $fd$ of an object

ject OB, at a distance, is formed in the focus *e* of the said glass, and in an inverted position. This image may be viewed by a single lens, *ab*, placed at its focal distance, as is usually done for viewing the heavenly bodies, because in them we do not regard the position: but for viewing objects near us, whose image we would have erect, we must, for that purpose, add a second lens *pq*, at double its focal distance from the other, that the rays which come from *ab* may cross each other in the focus *o*, in order to erect the image *gn*, which it will form in its own focus *m*, because the rays come parallel from the first lens *ab*. Lastly, a third lens *ic* is added, to view the secondary image *gn*. These three lenses, or eye-glasses, are usually of the same size and focal length; and the power of magnifying is always as the focal length of the object-glass *ew* divided by the focal length of the eye-glass *lm* or *he*: for instance, suppose $ew = 10$ feet or 120 inches, and *he* or $lm = 3$ inches; then will the object appear to the eye, through such a telescope, 40 times bigger than to the naked eye; and its surface will be magnified 1600 times, and its bulk or solidity 64000 times.

If instead of a convex eye glass we should use a concave one of the same focal length, it would represent the object erect, equally magnified, and more distinct and bright; but the disadvantage of this glass is, that it admits but of a small area, or field of view, and, therefore, not to be used when we would see much of an object, or take in a great scope; but it is used to great advantage in viewing the planets and their satellites, saturn's ring, jupiter's belts, &c.

The magnifying power of a refracting telescope is thus estimated: let AB (*ibid.* fig. 2.) be the object-glass, and CD the eye-glass; and let HFI and GFM be two rays coming from the extreme parts of a distant object, and crossing each other in the center F of the glass AB. Then is the angle GFH = IFM that under which the object appears to the naked eye; but IEM = CKD is that under which the image appears as magnified by the eye-glass CD. But the angle IEM is to the angle IFM, as LF to LE, or as the focal distance of the object-glass to the focal distance of the eye-glass; and in that proportion is the object magnified.

There is a defect in all telescopes of this kind, not to be remedied by any means whatever, which was thought only to arise from hence, *viz.* that spherical glasses do not collect rays to one and the same point; but it was happily discovered by Sir Isaac Newton, that the imperfection of this sort of telescope, so far as it arises from the spherical form of the glasses, bears almost no proportion to that which is owing to the different refrangibility of light. This diversity in the refraction of the rays is about a twenty-eighth part of the whole, so that the object-glass of a telescope cannot collect the rays, which flow from any one point in the object, into a less room than the circular space whose diameter is about the fifty-sixth part of the breadth of the glass. Therefore, since each point of the object will be represented in so large a space, and the centers of those spaces will be contiguous, because the points in the objects the rays flow from are so, it is evident that the image of an object made by such a glass must be a most confused representation, though it does not appear so when viewed through an eye-glass that magnifies in a moderate degree; consequently, the degree of magnifying in an eye-glass must not be too great with respect to that of the object-glass, lest the confusion become sensible. Notwithstanding however this imperfection, a dioptrical telescope may be made to magnify in any given degree, provided it be of sufficient length; for, the greater the focal distance of the object-glass is, the less may be the proportion which the focal distance of the eye-glass may bear to that of the object-glass, without rendering the image obscure. Thus an object-glass, whose focal distance is about four feet, will admit of an eye-glass whose focal distance shall be little more than one inch, and, consequently, will magnify almost forty-eight times: but an object-glass of forty feet focus, will admit of an eye-glass of only four inch focus, and will, therefore, magnify 120 times; and an object-glass of an hundred feet focus, will admit of an eye-glass of little more than six inch focus, and will therefore magnify almost 200 times.

The reason of this disproportion, in their several degrees of magnifying, is to be explained in the following manner: since the diameters of the spaces, into which rays flowing from the several points of an object are collected, are as the breadth of the object-glass, it is evident, that the degree of confusedness in the image is as the breadth of the glass (for the

the degree of confusedness will only be as the diameters or breadths of those spaces, and not as the spaces themselves.) Now the focal length of the eye-glass, that is, its power of magnifying, must be as that degree; for, if it exceeds it, it will render the confusedness sensible; and, therefore, it must be as the breadth or diameter of the object-glass. The diameter of the object-glass, which is as the square root of its aperture or magnitude, must be as the square root of the power of magnifying in the telescope; for, unless the aperture itself be as the power of magnifying, the image will want light: the square root of the power of magnifying, will be as the square root of the focal distance of the object-glass; and, therefore, the focal distance of the eye-glass must be only as the square root of that of the object-glass. So that in making use of an object-glass of a longer focus, suppose than one that is given, you are not obliged to apply an eye-glass of a proportionably longer focus than what would suit the given object-glass, but such a one only whose focal distance shall be to the focal distance of that which will suit the given object-glass, as the square root of the focal length of the object-glass, you make use of, is to the square root of the focal length of the given one. And this is the reason that longer telescopes are capable of magnifying in a greater degree than shorter ones, without rendering the object confused or coloured.

*Cata-dioptric*, or *reflecting* TELESCOPE, is the most noble and useful of all others; the mechanism of which is as follows: A B E H (*ibid.* fig. 3.) is the large tube, or body of the instrument, in which B E is a large reflecting mirrour, with a hole in the the middle C D. This mirrour receives the rays *a c*, *b d*, coming from the object at a distance, and reflects them converging to its focus *e*, where they cross each other, and form the inverted image I M; *xy* is a small concave mirrour, whose focus is at *f*, at a small distance from the image. By this means the rays coming from the image are reflected back through the central hole C D of the large mirrour, where they fall on the plano-convex lens W X, and are by it converged to a focus, and there form a second image R S, very large and erect, which is viewed by a meniscus eye-glass Y Z, by the eye at P, through a very small, hole in the end of the eye-piece Y C D Z. If the first lens W X were taken away, the image would be formed somewhat larger at *M I*; but the area or scope would be less, and therefore the view not so pleasant. At T V is placed a circular piece of brass, with a hole of a proper size to circumscribe the image, and cut off all superfluous or extraneous rays, that so the object may appear as distinct as possible.

As the image is formed by reflection, the rays of every sort will be united nearly in one point, and will therefore admit of an eye-glass Y Z of a deep charge, or small focal distance; and so the power of magnifying will be proportionally increased.

The magnifying power of a reflecting telescope is thus computed. The parallel rays K B (plate CCLXXII. fig. 1.) and L E are reflected by the large object speculum A F to its focus *a*, where the image I M is formed; which image is defined by two other rays N Q, P Q, coming from the extreme parts of the object at a remote distance, and meeting in the center of the large speculum at Q. Now if *f* be the focus of the small mirrour G H, supposing the image were formed in the said focus *f* (that is, that both the foci *a* and *f* were coincident) then the rays proceeding from the image I M will proceed parallel after reflection, and produce distinct vision of the image, which will then subtend an angle I O M at the center O of the speculum G H, which is to the angle I Q M, under which the object appears to the naked eye, as *a* Q to *a* O or *f* O. So that the magnifying power would in this case be as $\frac{aQ}{fO}$.

But, to increase this magnifying power, the image I M is not placed in the focus of the small speculum, but at a small distance beyond it; by which means the rays coming from the image to the speculum G H will be reflected converging to a distant focus R, where a secondary large image *I M* is formed from the first image I M; which image I M is seen under the same angle *I O M* with the foremer from the center of the speculum G H; but from the center of the eye-glass T V it is seen under the large angle *I* S *M*. But the angle *I* S *M* is to the angle *I* O *M* as O R to S R; wherefore the second ratio, or part of the magnifying power, is that of $\frac{OR}{SR}$.

Confequently the whole magnifying power of the telefcope is $\frac{aQ}{aO} \times \frac{OR}{SR}$ (becaufe in this cafe *f* O becomes *a* O.) Or, in other words, the angle N Q P, under which the object appears to the naked eye, is to the angle *I S M*, under which the large magnified fecondary image *I M* appears to the eye through the eye-glafs, as $\frac{aQ \times OR}{aO \times SR}$. Such is the theory of the telefcope firft contrived by Dr. J. Gregory, and therefore called the gregorian telefcope; but it received its laft improvement from the late Mr. Hadley, and is now in common ufe.

The machinery for fupporting and managing this telefcope, is thus defcribed by Dr. Smith, Opt. §. 924. The bafe of the pedeftal *a b* (*ibid.* fig. 3.) is a thick board *a*, refting upon four brafs feet; one of which being a pin, *p*, that fcrews through the board, will make it fteady upon any uneven plane: *b* is a fmall upright pillar about a foot long, fixed in the board *a*; and *c d* is a brafs-arm, that fcrews into it: *d e* is a fhort brafs-piece that runs round upon the end of the arm *c d*, and is tightened and ftayed by the fcrew *d*: *e* is a hollow focket, with a round brafs-ball in it, moveable every way: the neck of this ball is fixed to the middle of the brafs-piece *f g*, which is fixed along the fide of the tube *h i*, by the fcrews *f* and *g*. The eye-glaffes are placed in the end *l*, and the tube is adjufted to various diftances by means of the wire *h i k*. When this telefcope is ufed at home, the pedeftal *a b* may be placed upon a table near a window; but when it is ufed abroad, the pedeftal may be left at home: for having made a hole in the fide of a tree by the hand-augre *m*, the wood fcrew at the end of *c d* may be fcrewed into it.

A fmall alteration was made in the ftructure of this telefcope by Mr. Caffegrain, *viz.* in ufing a convex fpeculum *G H* (*ibid.* fig. 1.) inftead of the concave one G H. Now if they are equally fpherical, that is, if they are fegments of the fame fphere, then will *f* be alfo the vertual focus of the convex G H; and, if all other things remain the fame, the firft image I M will be virtually the fame as before, and the laft image *I M* will be really the fame; fo that the magnifying power of this form of the telefcope is $\frac{aQ \times OR}{aO \times SR}$, which is equal to that of Gregory's form.

Sir Ifaac Newton ordered this telefcope to be made in a different form or manner, as follows: A B C D (*ibid.* fig. 2.) was a large octogonal tube or cafe; E F a large polifhed fpeculum, whofe focus is at *o*; G H a plane fpeculum truly concentered, and fixed at half a right angle with the axis of the large one. Then parallel rays *a* E, *b* F, incident on the large fpeculum E F, inftead of being reflected to the focus *o*, were intercepted by the fmall plane fpeculum G H, and by it reflected towards a hole *c d* in the fide of the tube, croffing each other in the point O, which is now the true focal point; and from thence they proceed to an eye-glafs *e f* placed in that hole, whofe focal diftance is very fmall, and therefore the power of magnifying may be very great in this form of the telefcope; becaufe the image I M is made by one reflection (for that of the plane fpeculum only alters the courfe of the rays, and adds nothing to the confufion of the image) and will, for that reafon, bear being viewed by a glafs of a very deep charge, in comparifon of an image formed by differently refrangible rays.

This telefcope is a very good one, as to its effect or performance, but it is not fo commodious for common ufe as thofe of the gregorian form, and is therefore now pretty much laid afide. They who would fee a larger account hereof, may confult Sir Ifaac's Optics, and feveral Philofophical Tranfactions, where he defcribes it at large, and the reafons which induced him to make choice of this ftructure rather than that of Dr. Gregory: or fee a compendious account of the whole in the laft edition of Dr. Gregory's Elements of Optics.

*Solar* TELESCOPE. This inftrument is applied to ufe in the following manner: A B (*ibid.* fig. 4.) reprefents a part of the window-fhutter of a darkened room, C D the frame, which (by means of a fcrew) contains the fcioptric ball E F, placed in a hole of the faid fhutter adapted to its fize. This ball is perforated with a hole *a b c d* through the middle; on the fide *b c* is fcrewed into the faid hole a piece of wood, and in that is fcrewed the end of a common refracting telefcope G H, I K, with its object-glafs G H, and one eye-glafs at I K; and the tube is drawn out to fuch a length, as that the focus of each glafs may fall near the fame point.

This being done, the telefcope and ball are moved about in fuch a manner as to receive

receive the sun-beams perpendicularly on the lens G H, through the cylindric hole of the ball; by this glass they will be collected all in one circular spot *m*, which is the image of the sun. The lens I K is to be moved nearer to or farther from the said image *m*, as the distance at which the secondary image of the sun is to be formed requires, which is done by sliding the tube I K L M backwards and forwards in the tube L M N O. Then of the first image of the sun *m* will be formed a second image P Q, very large, luminous, and distinct.

In this manner the sun's face is viewed at any time, without offence to weak eyes; and whatever changes happen therein may be duly observed. The spots (which make so rare an appearance to the naked eye, or through a small telescope in the common way) are here all of them conspicuous, and easy to be observed under all their circumstances of beginning to appear, increase, division of one into many, the uniting of many into one, the magnitude, decrease, abolition, disappearance behind the sun's disk, *&c.*

By the solar telescope, we also view an eclipse of the sun to the best advantage, as having it in our power by this means to represent the sun's face or disk as large as we please, and consequently the eclipse proportionably conspicuous. Also the circle of the sun's disk may be so divided by lines and circles drawn thereon, that the quantity of the eclipse estimated in digits, may this way be most exactly determined: also the moments of the beginning, middle, and end thereof, for finding the longitude of the place: with several other things relating thereto. See the articles FACULÆ, MACULÆ, ECLIPSE, LONGITUDE, *&c.*

The transits of mercury and venus over the face of the sun, are exhibited most delightfully by this instrument. They will here appear truly round, well defined, and very black; their comparative diameters to that of the sun may this way be observed, the direction of their motion, the times of their ingress and egress, with other particulars for determining the parallax and distance of the sun, more nicely than has hitherto been done.

By the solar telescope, you see the clouds most beautifully pass before the face of the sun, exhibiting a curious spectacle according to their various degrees of rarity and density. But the beautiful colours of the clouds surrounding the sun, and refracting his rays, are best seen in the picture made by the camera-glass. See the article CAMERA.

The fine azure of the sky, the intensely strong and various dyes of the margins of clouds, the halo's and corona's, are this way inimitably expressed. And since the prismatic colours of clouds, so variously compounded here, make so noble and delightful a phænomenon, it is surprising that no more regard is had thereto by painters, whose clouds (though near the sun) are seldom or never seen tinged or variegated with those natural taints and colours. See the articles CLOUD, HALO and CORONA.

*Aerial* TELESCOPE, is a dioptric telescope, used without a tube, in a dark night; for the use of the tube is not only to direct the glasses, but also to make the place dark where the images of objects are formed.

Huygenius contrived a telescope of this kind for viewing the celestial bodies, by fixing the object-glass on the top of a long upright pole, and directing its axis towards any object by means of a silk line coming from the object-glass to the eye-glass below.

We shall here give the description of one of these telescopes. On the top of a long pole, or mast, *a b* (plate CCLXXIII. fig. 1.) is fixed a board moveable up and down in the channel *c d*: *e* is a perpendicular arm fixed to it, and *f f* is a transverse board that supports the object-glass inclosed in the tube *i*, which is raised or lowered by means of the silk thread *r l*; *g g* is an endless rope, with a weight *h*, whereby the apparatus of the object-glass is counterpoised; *k l* is a stick fastened to the tube *i*; *m* the ball and socket, by means of which the object-glass is moveable every way; and to keep it steady there is added a weight *n* suspended by a wire; *l* is a short wire, to which the thread *r l* is tied; *o* is the tube which holds the eye-glass; *q* the stick fixed to this tube, *s* a leaden bullet, and *t* a spool to wind the thread on; *u* is pins for the thread to pass through; *x* the rest for the observer to lean upon; and *y* the lantern. In this manner, telescopes have been constructed 123 feet long.

There are several ways of preparing a pole of a proper height, which every workman can readily employ. But as unexperienced persons cannot easily find out and follow an object with this sort of telescope, we shall shew how this may be

 done

done by means of a ſmall machine placed upon a reſt *a a* (*ibid.* fig. 2.) and a variable rhombus made of braſs plates *b b*, two of whoſe ſides are produced, till they equal the ſides of the rhombus, which is fixed at *g g* to the reſt. From the upper angle of the rhombus, there projects a ſmall axis about half an inch: on this axis is fixed the plate *e*, which upon a very ſmall axis ſupports the ſtick and tube of the eye-glaſs; and the whole is counterpoiſed upon the axis *f* by proper weights *h, h*. Things being thus ordered, to whatever place the obſerver ſhall move the object-glaſs, by the handle *d*, there it will remain at reſt.

And for managing the object-glaſs, M. de la Hire contrived the machine repreſented, *ibid.* fig. 3. where E F is an oblong piece of wood, of a convenient magnitude, to the ends of which are fixed two cylindrical ſtaves GH, I K, to ſerve as an axis; then a hole is bored in a line with this axis, for the wooden axis S L M to paſs through, with two nuts S, M. To the upper end, S, is fixed a ſquare board A C, with a circular pole in it to receive the object-glaſs; and to the bottom corners of this board are fixed two wooden rulers, which meet at N, where there is a pin, R; to which the ſilk-thread for moving the object glaſs is tied, as much below the line CD as the axis GK, which lies upon two tenter-hooks O, P. To keep off the dew from the object-glaſs, the ſame gentleman orders it to be included in a paſteboard-tube, made of ſpungy-paper, to ſuck up the humidity of the air: and to find an object more readily, he preſcribes a broad annulus of white paſteboard to be put over the tube that carries the eye-glaſs; upon which the image of the object being painted, an aſſiſtant, that ſees it, may direct the tube of the eye-glaſs into its place: or, that the obſerver himſelf may ſee it, he would have it received upon a ring of tranſparent oiled paper, paſted upon a circular frame inſtead of paſteboard.

TELESCOPE-SHELL, in ichthyology, the conic turbo, with plane, ſtriated, and very numerous ſpires. See TURBO.

*Tubes for* TELESCOPES. See TUBE.

TELESIN, a province of the kingdom of Algiers, in Africa, ſituated on the confines of the empire of Morocco.

TELGA, a city of Sweden, in the province of Sunderland, ſituated on the ſouth-ſide of the Meller-lake, twenty miles ſouth-weſt of Stockholm.

TELLER, an officer of the exchequer, in antient records called tallier; there are four of theſe officers, whoſe duty is to receive all ſums due to the king, and to give the clerk of the pells a bill to charge him therewith. They likewiſe pay all money due from the king, by warrant from the auditor of the receipt, and make weekly and yearly books, both of their receipts and payments, which they deliver to the lord-treaſurer.

TELLONIUM. See THELONIUM.

TELLICHERRY, a port-town on the Malabar coaſt, in the hither India, thirty miles north of Callicut: eaſt long. 75° north lat. 12°.

TELLINA, in ichthyology, a name given to thoſe ſpecies of muſcles, which have equal extremities, and are of an oblong plane figure. See the article MYTULUS.

TELLUS. See the article EARTH.

TEMACHIS, in natural hiſtory, the name of a genus of foſſils, of the claſs of the gypſums, the characters of which are theſe: It is of a ſofter ſubſtance than many of the other genera, and of a very bright and glittering hue. See the article GYPSUM.

The bodies of this genus are compoſed of an aſſemblage of multitudes of irregular, flaky fragments, as are all the gypſums; but no genus of them ſo viſibly ſo as this. There are but three known ſpecies of this genus. 1. A ſoft, ſhining, green one. 2. A ſoft, white one, of a marbly appearance. And, 3. A pale, brown, gloſſy one. The firſt is found in great plenty on the ſhores of rivers in the Eaſt-Indies; and though not known as a ſubſtance that would make a plaſter by burning, is given internally in nephritic caſes, being powdered without calcination. The ſecond is found in many parts of Derbyſhire, and is uſed for burning into plaſter for ſtuccoing of rooms, and caſting ſtatues, &c. And the third is found in Germany; and, beſide its common uſes in ſtuccoing and caſting, is in great eſteem among the metallurgiſts and eſſayers, for the making either ſingly or in mixture with bone-aſhes, their teſts. See the article TEST.

We have not this ſpecies in England ſo far as is yet known.

TEMESWAER, the capital city of the Bannat of Temeſwaer, lately annexed to Hungary, ſixty miles north-eaſt of Belgrade: eaſt long. 22°, north lat. 45° 55′.

TEMPERAMENT, among phyſicians, denotes

denotes the ſame with conſtitution; or a certain habitude of the humours of the human body, whereby it may be denominated hot, cold, moiſt, dry, bilious, ſanguine, phlegmatic, melancholic, &c. See the article CONSTITUTION.

According to Boerhaave, moiſtening, diluting, and temperating ſubſtances, are a proper diet for perſons of a hot and acrid temperament; and, on the contrary, all heating things are prejudicial to them: whereas, in perſons of a cold and moiſt habit, juſt the reverſe of this obtains. To perſons of a ſanguineous temperament, evacuating and temperating medicines are beneficial, and heating or draſtic ſtimulating things pernicious. Perſons of a melancholy temperament are greatly injured by hot, drying, and acrid ſubſtances; whereas moiſtening, refrigerating, relaxing, emollient ſubſtances, and ſuch as gently diſſolve without any acrimony, are beneficial to them.

TEMPERAMENT in muſic, is the rectifying or mending the imperfect concords, by transferring to them part of the beauties of the perfect ones. See the articles CONCORD and INTERVAL.

In order to this, muſicians take a medium between the two, which they call a temperament. Suppoſing then, one tone increaſed, and the others diminiſhed, by half a comma, we ſhould have our thirds major perfect: but ſtill, it is neceſſary to examine, what fifths this ſuppoſition would give. Now it is evident, that a tone-major added to an octave, makes juſt two fifths, thus $\frac{2}{1} \times \frac{9}{8} = \frac{9}{4} = \frac{3}{2} \times \frac{3}{2}$. But the tone here added is a tone major, and the tone we have aſſumed is a temperate tone, deficient from the tone major by half a comma; hence the ſum of the two fifths, on this ſuppoſition, will fall ſhort of the truth by $\frac{1}{2}$ of a comma, and conſequently one fifth will be deficient by $\frac{1}{4}$ of a comma. Which difference, although it be ſenſible, yet experience ſhews, that fifths ſo diminiſhed are tolerable.

This is what is called the common or vulgar temperament, and conſiſts, as has been ſaid, in diminiſhing the fifth by $\frac{1}{4}$ of a comma, in preſerving the third major perfect, and dividing it into two equal tones. Which being ſuppoſed, it follows that the fourth muſt exceed the truth by $\frac{1}{4}$ of a comma; that the third minor will be deficient by the ſame quantity; that the ſixty minor will be perfect, and the ſixth major redundant by $\frac{1}{4}$ of a comma; and laſtly, that the ſemitone major will exceed the truth by $\frac{1}{4}$ of a comma. If we introduce chromatic notes, or flats and ſharps, the ſemitone minor will alſo exceed the truth by $\frac{1}{4}$ of a comma, and conſequently the difference between the two ſemitones, or the dieſis enharmonica, will be preſerved.

There are alſo other temperaments propoſed by different authors; as that of 31 parts by Mr. Huygens; Mr. Sauver's of 43, Mr. Henfling's of 50, and that of 12.

TEMPERING *of ſteel and iron*, the rendering them either more compact and hard, or ſoft and pliant, according as the different uſes for which they are wanted may require. See IRON and STEEL.

This operation conſiſts in plunging them, while red hot, into ſome liquor prepared for the purpoſe; ſometimes in pure water, as lockſmiths, &c. which ſeldom uſe any other: and ſometimes a compoſition of divers juices, liquors, &c. is uſed; which is various according to the manner and experience of the workman; as vinegar, mouſe-ear water, the water oozing from broken glaſſes, ſoot, ſalt, oil, &c. To harden and temper engliſh, flemiſh, and ſwediſh ſteel, they muſt have a pretty high heat given them, and then be ſuddenly quenched in water to make them hard: but ſpaniſh and venetian ſteel will require no more than a blood-red heat before it is quenched.

If the ſteel be too hard or brittle for an edged tool, &c. take it down by rubbing a piece of grind-ſtone or whet-ſtone hard upon the work, to take off the black ſcurf; then brighten or heat it in the fire, and as it grows hotter, you will ſee the colour change by degrees, coming firſt to a ſtraw or light gold-colour, then to a darker gold-colour, and at laſt to a blue colour.

Chooſe ſuch of theſe colours as the work requires, then quench it ſuddenly in the water. The light-gold colour is for files, cold chiſſels, and punches to punch iron and ſteel: the dark gold-colour, for punches to uſe on braſs, &c. the blue colour gives the temper for ſprings.

The tempering of files and needles is performed after a peculiar manner.

The antients appear to have had ſome better method of tempering, than any of the moderns are acquainted withal; witneſs their works in porphyry, a ſtone ſo hard, that none of our tools make an impreſſion upon it.

TEMPLARS, or TEMPLERS, a religious order inftituted at Jerufalem, about the year 1118. Some religious gentlemen put themfelves under the government of the patriarch of Jerufalem, renounced property, made the vow of celibacy and obedience, and lived like canons regular. King Baldwin affigned them an apartment in his palace. They had likewife lands given them by the king, the patriarch, and the nobility, for their maintenance. At firft there were but nine of this order, and the two principal perfons were Hugo de Paganis, and Geoffrey of St. Omers. About nine years after their inftitution, a rule was drawn up for them, and a white habit affigned them, by pope Honorius II. About twenty years afterwards, in the popedom of Eugenius III. they had red croffes fewed upon their cloaks, as a mark of diftinction; and in a fhort time they were increafed to about three hundred, in their convent at Jerufalem. They took the name of Knights Templars, becaufe their firft houfe ftood near the temple dedicated to our Saviour, at Jerufalem. This order, after having performed many great exploits againft the infidels, became rich and powerful all over Europe; but the knights, abufing their wealth and credit, fell into great diforders and irregularities. Many crimes and enormities being alledged againft them, they were profecuted in France, Italy and Spain; and at laft, the pope, by his bull of the 22d of May, 1312, given in the council of Vienna, pronounced the extinction of the order of Templars, and united their eftates to the order of St. John of Jerufalem.

TEMPLE, a general name for places of public worfhip, whether pagan, chriftian, or otherwife. But the word, in a reftrained fenfe, is ufed to denote the places, or edifices, in which the pagans offered facrifice to their falfe gods. Thus we hear of the Temples of Jupiter, Apollo, Bacchus, *&c.* They were built and adorned with all poffible fplendor and magnificence, partly out of refpect to the gods, and parly to create an awe and reverence in the worfhippers. They were conftructed in the manner which was thought moft agreeable to the gods, to whom they were dedicated. Thus Jupiter, they thought, took moft delight in pillars of the doric order; Bacchus in the ionic; and Vefta in the corinthian; this rule, however, was not univerfally or conftantly obferved. Temples were divided into two parts; the one called Adytum, which was the inmoft recefs of the building, and deemed fo facred, that none but the priefts were allowed to enter into it; the other was open, and free to all, who came to pay worfhip. In the middle of the temples ftood the images of the gods, on pedeftals, raifed above the height of the altar, and inclofed with rails.

Temples, according to the number and difference of their columns, were divided into tetraftyle, proftyle, amphiproftyle, periptere, diptere, pfeudo-diptere, hypæthros, and monoptere, temples. See the article TETRASTYLE, *&c.*

TEMPLES, in anatomy, a double part of the head, reaching from the forehead and eyes to the two ears. See HEAD.

TEMPORAL, a term generally ufed for fecular, as a diftinction from ecclefiaftical. Thus we fay temporal lords, and fpiritual or ecclefiaftical lords.

TEMPORALIS, in anatomy. See the article CROTAPHITES.

TEMPORALITIES, the temporal revenues of an ecclefiaftic, fuch as have been annexed to bifhops-fees by kings, and other great perfonages of this land, as they are barons and lords of parliament, fuch as manors, lands, and lay-fees.

TEMPORUM OSSA. See the article PETROSA OSSA.

TENAILLE, in fortification, a kind of outwork, refembling a horn-work, but generally fomewhat different, for inftead of two demi-baftions, it bears only in front a re-entering angle betwixt the fame wings without flanks; and the fides are parallel. See the articles FORTIFICATION and HORN-WORK.

Tenaille double or flanked, is a work, whofe front confifts of four faces, making two re-entering angles, and three faliant; the wings or fides of this work being in like manner correfpondent in the front of the gorge. See the article GORGE.

Tenaille fimple, a work having its front formed by two faces, which make a re-entering angle, the fides running directly parallel from the head to the gorge.

Tenaille of the place, is that which is comprehended between the points of two neighbouring baftions; that is to fay, the curtain, the two flanks that are raifed on the curtain, and the two fides of the baftions which face one another; fo

ſo that it is the ſame with what is otherwiſe called the face of the fortreſs. See the article BASTION, &c.

Tenaille of the foſs, is a low work raiſed before the curtain in the middle of the foſs: it is of three ſorts; the firſt is compoſed of a curtain, two flanks and two faces; the rampart of the curtain, including the parapet and talus, is but five fathom thick, but the rampart of the flanks and faces is ſeven. The ſecond is compoſed only of two faces made on the lines of defence, whoſe rampart and faces are parallel. The third ſort differs from the ſecond, only in this, that its rampart is parallel to the curtain of the place. All three ſorts are good, and cannot be hurt by the beſiegers cannon, till they are maſters of the covert way, and have planted their cannon there. See FOSS.

All tenailles are defective in this reſpect, that they are not flanked or defended towards their inward or dead angle; becauſe the height of the parapet hinders ſeeing down before the angle, ſo that the enemy can lodge himſelf there under covert: wherefore tenailles are never made but when they want time to make a horn-work.

TENANT, one that holds lands or tenements of ſome lord, or landlord, by rent, fealty, &c. There are ſeveral ſorts of tenants, as tenants in fee, tail, for life, years, or at will. There are alſo joint-tenants, tenants in common. See the article JOINT-TENANT, &c.

Tenant to the præcipe, is the perſon againſt whom the writ of præcipe is to be brought in ſuing out a common recovery. See the article PRÆCIPE.

TENANT, or TENAN, in heraldry. See the article SUPPORTERS.

TENAR, in anatomy. See THENAR.

TENBURY, a market-town of Worceſterſhire, fifteen miles north-weſt of Worceſter.

TENBY, a port-town of Pembrokeſhire, ſituated on Briſtol channel: weſt long. 4° 45′, north lat. 51° 40′.

TENCH, in ichthyology, the engliſh name of a ſpecies of the cyprinus, of a purpliſh black colour; with an even tail; its length in generally about ten or eleven inches, its breadth about three, and its thickneſs more than two; but it ſometimes grows to an immoderate large ſize. See the article CYPRINUS.

For the method of fiſhing for tench, See the article FISHING.

TENDE, a town of Piedmont, in Italy, twenty-five miles north-eaſt of Nice.

TENDER, in law, ſignifies carefully to offer, or circumſpectly endeavour the performance of a thing; as to tender rent is to offer it at the time and place when and where it ought to be paid, which is done to ſave the penalty of a bond or obligation, before action is brought thereon. A tender of rent on any part of the land occupied, or at any time of the laſt day of payment, will ſave the proviſo, or condition for that time, whether the landlord does accept of it or not; and yet though the rent be duly tendered, the landlord may afterwards bring action of debt; but he cannot recover any damages, for in that caſe the tenant's tender excuſes the damages, but does not debar the landlord of his rent: but it muſt be obſerved, that a tender of rent made to ſave forfeiture, muſt be of the whole rent due without any deduction, on account of the taxes, &c. unleſs it be ſo agreed betwixt the landlord and tenant; for ſtoppage is no payment in law. Where a tender is of money due on a bond, it muſt be made to the perſon of the obligee on the day appointed; nevertheleſs, if the obligor be afterwards ſued, he muſt ſtill pay the money.

TENDER, a ſmall ſhip, in the ſervice of men of war, for carrying of men, proviſions, or any thing elſe that is neceſſary.

TENDONS, are white, firm, and tenacious parts, continuous to the muſcles, and uſually forming their extremities. When the fibres of which they are compoſed, expand themſelves into a membrane, they are called Aponeuroſes. See the article MUSCLE.

Tendo Achillis, is a large tendon, formed by the union of the tendons of the four exterior muſcles of the foot; it is ſo called, becauſe the fatal wound whereby Achilles is ſaid to have been ſlain, was given there.

TENEBRÆ, an office in the romiſh church, performed on Wedneſday, Thurſday, and Friday, in Paſſion Week, at which time, neither flowers nor images are allowed to be ſet upon the altars, but they muſt be covered with purple.

TENEBRIO, *the ſtinking beetle*, in natural hiſtory, a genus of inſects, the antennæ of which are ſlender, oblong, and filiform; the elytra are joined together, and there are no interior wings.

TENEDOS,

TENEDOS, one of the ſmalleſt iſlands of the Archipelago, ſituated near the coaſt of leſſer Aſia, weſt of the ruins of Troy, eaſt long. 27°, north lat. 39° 30′.

TENEMENT, properly ſignifies a houſe; but in a larger ſenſe it is taken for any houſe, land, rent, or other thing, which a perſon holds of another.

TENEMENTARY LANDS, ſuch as are held by the tenant, diſtinguiſhed by that name from the demeſne land of the lord, called inland.

TENEMENTIS LEGATIS, a writ that antiently lay to the city of London, or any other corporation, where, according to the old cuſtom, men might deviſe tenements, as well as goods and chattels, by their laſt will, for the determining of any controverſy relating thereto, and for rectifying the wrong tenant.

TENENTIBUS IN ASSISA NON ONERANDIS, a writ which lies for the perſon to whom a diſſeiſor has aliened the land, whereof he diſſeiſed another; that he be not arreſted on the damages awarded on the aſſize, if the diſſeiſor has wherewith to ſatisfy them himſelf.

TENERIF, one of the largeſt of the Canary Iſlands, ſituated in the Atlantic Ocean: weſt long. 17°, north lat. 28°, being about 120 miles in circumference. It is a fruitful iſland abounding in corn, wine and oil, though pretty much incumbered with mountains, of which the moſt remarkable is that called the pico of Tenerif, being one of the higheſt mountains in the world, in the form of a ſugar-loaf, the white top whereof may be ſeen at ſea, upwards of one hundred miles.

TENES, a province of the kingdom of Algiers, in Africa.

TENESMUS, in medicine, a name given by medical writers, to a complaint which is a continual deſire of going to ſtool, but without any ſtool being ready to be voided. This is uſually attended with ſome tumour, ſometimes with a very conſiderable one in the part. This is properly no primary diſeaſe, but merely a ſymptomatic one, and differs in degree according to the diſeaſe on which it is an attendant. Signs of it are a titillation and itching about the anus, attended with a violent burning pain, and a deſire of compreſſing and voiding ſomething, and this attended uſually with no excrement, or only a pituitous or mucous matter, and very often prolapſus ani, or falling down of the rectum. This diſeaſe happens often to people labouring under hæmorrhoidal diſorders, eſpecially when the diſcharges attending them do not ſucceed regularly, though nature gives all the neceſſary motions for their excretion. It happens alſo to people who are ſubject to void an acrid and bilious matter by ſtool, and not unfrequently to thoſe who have a ſtone in the bladder. Women in the latter part of their time in going with child, have alſo very often terrible fits of it, attended with conſiderable ſwelling; this happens to them from the preſſing of the uterus with its burden, upon the rectum and hæmorrhoidal veins. The cauſes of a teneſmus, beſides thoſe already mentioned, are the aſcarides, a ſmall ſort of worms, which uſually infeſt the rectum, and occaſion a continual itching and tickling there; the abuſe of reſinous purging medicines. Much riding will alſo ſometimes occaſion it. See PROLAPSUS, HÆMORRHOID, &c.

As the teneſmus is merely a ſymptomatic diſeaſe, the primary diſorder is firſt to be examined, and treated in order to a cure; thus, when it is occaſioned by aſcarides, worm medicines are to be given, and clyſters of a proper kind injected; and when the worms are by this means deſtroyed, the teneſmus, which was no more than a ſymptom, naturally ceaſes. In general, the regimen and method of cure proper in a teneſmus, are the ſame with thoſe preſcribed in a dyſentery; great relief is afforded by a fomentation of warm milk, in which elder flowers have been boiled, as alſo by a clyſter of mutton-broth, or an emollient clyſter, in which earth-worms have been boiled. The medicines, at preſent, generally uſed for the cure of a teneſmus, are theſe following: Take of pulvis ſanctus and rhubarb, each one ſcruple; of the oil of cinnamon, one drop; of London laudanum, half a grain; and of the ſyrup of violets, a ſufficient quantity for making into a bolus, to be taken in the morning, and repeated as the ſituation of the patient requires; at night, a paregoric may be exhibited, and clyſters afterwards uſed; for which purpoſe, take of whey, or mutton-broth, four ounces; of canary wine, two ounces; of gum arabic, half an ounce; of gum tragacanth, one dram; and of crude opium, two grains; make into a clyſter, to be injected twice or thrice a day, afterwards continue the following medicine for ſome time: Take of the confection of Fracaſtorius, without honey, one

one scruple; of sperma ceti, fifteen grains; of the species hyacinthæ, japan earth, red coral, and american bole, each eight grains; of the oil of nutmegs, one drop; and syrup of red roses, a sufficient quantity for making a bolus, to be taken twice a day, in a small quantity of the tincture of red roses. In a tenesmus, the last refuge is to opiates.

TENET, or TENENT, a particular opinion, dogma, or doctrine, professed by some divine, philosopher, &c.

TENNE, TENNY, or TAWNY, in heraldry, a bright colour made of red and yellow mixed; sometimes also called brusk, and expressed in engraving, by thwart, or diagonal strokes or hatches, beginning from the sinister chief, like purpure, and marked with the letter T. In the coats of all below the degree of nobles, it is called tenny; but in those of nobles, it is called hyacinth; and in princes coats, the dragon's head. See plate CCLXXIV. fig. 3.

TENON, in building, &c. the square end of a piece of wood, or metal, diminished by one third of its thickness, to be received into a hole in another piece, called a mortise, for the jointing or fastening the two together. It is made in various forms, square, dove-tailed for double mortises, and the like.

TENOR, or TENOUR, the purport or content of a writing or instrument in law, &c. An action of debt brought upon a judgment in an inferior court, where the defendant pleads, *nul tiel record*, no such record, a tenor thereof only shall be certified; and it likewise is the same on certioraris. A tenor of a libel has been held to be a transcript of it.

TENOR, or TENORE, in music, the first mean, or middle part, or that which is the ordinary pitch of the voice, when neither raised to a treble, or lowered to a bass. The tenor is commonly marked in thorough bass with the letter T. This is that part which almost all grown persons can sing; but as some have a greater compass of voice upwards, others downwards, others are confined to a kind of medium, and others can go equally high or low; hence musicians make a variety of tenors, as a low, a high, a mean, a natural tenor, to which may be added, a violin tenor, &c. for instruments. The Italians usually distinguish two kinds of tenor, *tenore primo*, or 1° or P°, which answers to our upper tenor; and *tenore secundo*, 2°, or II°, which is our natural tenor, confounding the counter tenors, &c. under the name of baritono. See the article BARITONO, &c.

TENOR, or TENORISTA, is also used for a person who sings the tenor part in concert also, for any instrument proper to play it.

TENORE INDICTAMENTI MITTENDO, in law, a writ for the removing of a record of an indictment, and the process thereon out of another court, into the king's-bench. It is usual in these cases to certify the record itself, except it be from London, by virtue of the city charter.

TENORE PRESENTIUM, *by the tenor of these presents*, in law, is taken for the substance, true intent and meaning of a deed, or other writing. See DEED, &c.

TENSE, TIME, in grammar, an inflection of verbs, whereby they are made to signify, or distinguish the circumstance of time, in what they affirm. See VERB.

There are only three simple tenses or times; the present, as *amo*, *I love*; the preterit, as *amavi*, *I have loved*; and the future, as *amabo*, *I shall* or *will love*. See the article PRESENT, &c.

But, as in the preterit, one may say, that the thing is but just now done; or indefinitely, that it was done; hence, in most languages, there are two sorts of preterits or past tenses; the one definite, which marks the thing to be precisely done, as *I have said*, *I have done*, *I have dined*; the other signifies it done indeterminately, and is for that reason called indefinite, or aorist, as *I wrote*, *I went*, &c. See the article AORIST, IMPERFECT, PLUSQUAMPERFECT, &c.

TENT, in surgery, a roll of lint worked into the shape of a nail, with a broad flat head. Tents differ in thickness and length, according to the size of the wound for which they are intended, as appears by the figures in plate CCLXXIV. fig. 1. at the letters K, L, M, N. These tents are chiefly used in deep wounds and ulcers. They are of service not only in conveying medicines to the most intimate recesses and sinuses of the wound, but to prevent the lips of the wound from uniting, before it is healed from the bottom; and by their assistance grumous blood, sordes, &c. are readily evacuated. They ought to be made extremely soft, that the cure of the wound may not be retarded by the pain they would otherwise bring on.

There is another kind of tents made of linen-rags not scraped, and worked up into

into a conical form, to the bafis of which is faftened a long thread; the apex of this tent muft be a little unravelled, to make it fofter, left it may become painful: the thread is faftened to the bafis, that the tent may be recovered with the greater eafe, if, by any accident, it fhould be forced into the cavity of the thorax or abdomen (*ibid.* letter O); for the tents we now defcribe, are chiefly ufed to keep open wounds that penetrate into the cavity of the thorax or abdomen, in order to make way for the proper difcharge of blood, matter, *&c.* There is a third fort of tents, which ferve not only to keep open, but to enlarge, by degrees, the mouth of any wound or ulcer, which fhall be thought too ftrait; that, by this means, a free paffage may be procured for the blood and matter that were confined, and that proper medicines may find a more ready admittance. Thefe tents are made either of fponge, prepared in a certain manner; or of dried roots of gentian, calamus aromaticus, *&c.* for their fubftances imbibe the matter which flows to them, and being prefently enlarged dilate the lips of the wound.

TENTER, a machine ufed in the cloth manufacture, to ftretch out the pieces of cloth, ftuff, *&c.* or only to make them even, and fet them fquare.

It is ufually about four feet and a half high, and, for length, exceeds that of the longeft piece of cloth. It confifts of feveral long pieces of wood, placed like thofe which form the barriers of a manege; fo that the lower crofs piece of wood may be raifed or lowered, as is found requifite, to be fixed at any height, by means of pins. Along the crofs-pieces, both the upper and under one, are hooked nails, called tenter-hooks, driven in from fpace to fpace.

TENTERDEN, a market-town of Kent, twenty miles fouth-weft of Canterbury.

TENTHREDO, in natural hiftory, a genus of the hymenoptera clafs of infects, the female having a ferrated point or weapon at the tail: the worm produced of the egg has feveral feet. The fpecies of this genus have been generally confounded with the ichneumon. See the article ICHNEUMON.

TENURE, in law, fignifies the manner whereby lands or tenements are held, or the fervice that the tenant owes to his lord: it likewife denotes the eftate in the land. Tenures were antiently divided into the following: efcuage; that is, land held by the fervice of the fhield, and thereby the tenant was, at his own expence, obliged to follow his lord into the wars. Knight's fervice and chivalry; when lands were held of the king, or mefne-lord, to perform fervice in war. Burgage tenure; land held of the lord of the borough, at a certain rent. Villenage, otherwife termed bafe-tenure; whereby the tenant was bound to do all inferior fervices, commanded by the lord. Grand-ferjeanty; lands held by honorary fervices at the king's coronation. Petit-ferjeanty; lands held of the king, to contribute yearly fome fmall thing towards his wars. Frankalmoine; that tenure by which lands were held by ecclefiaftics, in free and perpetual alms. Socage-tenure; where lands are held by tenants, to plow their lord's land, and perform other offices of hufbandry, at their own expence. But all thefe antient tenures and fervices are, in general, taken away, and reduced into common and free focage. The ufual tenures at prefent are, fee-fimple; which is an abfolute tenure of lands to a man and his heirs for ever. Fee-tail; a limited fee, to a perfon and the heirs of his body begotten. Curtefy-tenure; where a man having married a woman feifed in fee, *&c.* has iffue born alive by her, in which cafe, after her death, the hufband is tenant by the curtefy of England. Tenure in dower; is where a widow holds, for her life, a third part of her hufband's land, whereof he was feifed in fee at any time during the coverture. There is alfo a tenure for life, or years, when lands are held for thofe terms on referved rents. Copyhold-tenure, is a holding for lives, or in fee, at the will of the lord, according to the cuftom of the manor.

TEPID, a term ufed by writers on mineral waters, *&c.* to exprefs fuch of them as have a lefs fenfible cold than common water. See MINERAL WATER.

TERAMO, a town of Italy, in the kingdom of Naples, and territory of Abruzzo, forty-two miles fouth of Loretto: eaft long. 15°, and north lat. 42° 40'.

TERCERA, one of the largeft of the Azores or weftern-iflands, fituated in the Atlantic ocean: weft long. 28°, and north lat. 39°.

TEREBINTHUS, the TURPENTINE-TREE. See the article TURPENTINE.

TERES, in anatomy, a name given to two mufcles of the arm; one is called teres major, and is one of the depreffor mufcles, which has its origin at the lower angle of the

the fcapula, and its termination three fingers below the head of the humerus: the other is called teres minor, being one of the abductor-mufcles, and having its origin at the inferior cofta of the fcapula; this, together with the infrafpinatus, properly forms one conjunct mufcle, having, at the extremity, only a fingle tendon, which is inferted into the pofterior part of the neck of the humerus.

TERGIFOETUS PLANTS, fuch as bear their feeds on the backfides of their leaves: fuch are all the capillary plants.

TERGOWISCO, the capital of Wallachia, in european Turky, eighty miles fouth-eaft of Hermanftat in Tranfilvania: eaft long. 26° 30′, north lat. 45° 35′.

TERKI, a port-town of Circaffia, in Afia, fituated on a river of the fame name, near the Cafpian Sea: eaft long. 52°, and north lat. 43° 40′.

TERM, *terminus*, in general, fignifies much the fame with boundary or limit. See BOUNDARY and LIMIT.

TERM, in law, is generally taken for a limitation of time or eftate; as a leafe for term of life, or years, which is deemed a chattel real. See CHATTEL.

Term, however, is more particularly ufed for that time wherein our courts of juftice are open; in oppofition to which, the reft of the year is called vacation. There are four of thefe terms in a year, *viz.* 1. Hilary-term, which begins on Jan. 23. but if that is a Sunday, the next day, and ends on Feb. 12. 2. Eafter-term, which begins the Wednefday fortnight after Eafter-day, and ends the Monday next after Afcenfion-day. 3. Trinity-term, which begins on the firft Friday after Trinity-funday, and ends the Wednefday fortnight after. 4. Michaelmas-term, which begins on Nov. 6. and ends the 28th of the fame month.

It has been held, that courts do not fit except in term-time, as to giving of judgments, &c. and in every term there are four days, thus diftinguifhed; that is, the effoin-day, the day of exceptions, the day of return of writs, and day of appearance. On the effoin-day the term is faid to begin, when one judge fits in each of the courts of Weftminfter, in order to take and enter effoins: but it is not till three days afterwards, that all the judges fit for the difpatch of bufinefs. There are likewife different returns in different terms, fome having more, fome fewer: and as, in the king's bench, all returns are to be made on fome particular day of the week in each term, care muft be taken not to make the writs out of that court returnable on a non-judicial day, as Sunday, All-faints, &c. See RETURN.

*Oxford* TERMS. Hilary, or lent-term, begins on Jan. 14. and ends the Saturday before Palm-funday. Eafter-term begins the tenth day after Eafter, and ends the Thurfday before Whit-funday. Trinity-term begins the Wednefday after Trinity-funday, and ends after the act, fooner or later, as the vice-chancellor and convocation pleafe. Michaelmas-term begins on Oct. 10. and ends Dec. 17.

*Cambridge*-TERMS. Lent term begins on Jan. 13. and ends the Friday before Palm-funday. Eafter-term begins the Wednefday after Eafter-week, and ends the week before Whit-funday. Trinity-term begins the Wednefday after Trinity-funday, and ends the Friday after the commencement. Michaelmas-term begins Oct. 10. and ends Dec. 16.

*Scottifh* TERMS. In Scotland, Candlemas-term begins Jan. 23. and ends Feb. 12. Whitfuntide-term begins May 25. and ends June 15. Lammas-term begins July 20. and ends Aug. 8. Martinmas-term begins Nov. 3. and ends Nov. 29.

TERM, in grammar, denotes fome word or expreffion of a language.

TERM *in the arts*, or TERM *of art*, is a word which, befides the literal and popular meaning which it has, or may have, in common language, bears a further and peculiar meaning in fome art or fcience.

TERM, in logic. A propofition is faid to confift of two terms, *i. e.* two principal and effential words, the fubject, and the attribute. See PROPOSITION.

TERMS *of an equation*, in algebra, are the feveral names or members, of which it is compofed, and fuch as have the fame unknown letter, but in different powers or degrees: for if the fame unknown letter be found in feveral members in the fame degree or power, they fhall pafs but for one term.

As, in this equation, $xx+ax=bb$; the three terms are $xx$, $ax$, and $bb$. Moreover, in this, $x^4+x^3+x^2+\frac{ab}{cd}x+\frac{fp}{rs}x+yy=0$; the terms are $x^4$, $x^3$, $x^2$, $\frac{ab}{cd}+\frac{fp}{rs}\times x$, and $yy$. Where $\frac{ab}{cd}x$, and $\frac{fp}{rs}x$, are the fame terms; and the firft term in any equation muft be that

where the unknown root hath the higheft dimenfions; and that term which hath the root in it, of one dimenfion of power lower, is called the fecond term, and fo on.

Terms *of proportion*, in mathematics, are fuch numbers, letters, or quantities, as are compared one with another.

Thus, if $\frac{2 . 4 : : 8 : 16}{a . b : : c : d}$, then $a$, $b$, $c$, $d$, or 2, 4, 8, 16, are called the terms; $a$ being the firft term, $b$ the fecond term, &c.

Terms, or Courses, in medicine, the menfes, or women's monthly purgations. See the article Menses.

TERMINALIA, in antiquity, feafts celebrated by the Romans, in honour of the god Terminus.

Varro is of opinion this feaft took its name from its being at the term or end of the year: but Feftus is of a different fentiment, and derives it from the name of the deity in whofe honour it was held.

TERMINATION, *terminatio*, in grammar, the ending of a word, or laft fyllable thereof. See Word and Syllable.

It is the different termination of one and the fame words on different occafions, that conftitute the different cafes, numbers, tenfes, and moods, &c. See the articles Case, Number, &c.

TERMINI, or Termole, a town of the province of Capitanate, in the kingdom of Naples, feventy miles north-eaft of the city of Naples.

TERNATE, the moft northerly of the Molucca or Clove-iflands, in the poffeffion of the Dutch.

TERNATEA, in botany, a plant, otherwife called clitoria. See Clitoria.

TERNI, a town of Italy, fubject to the pope, forty-fix miles north-eaft of Rome.

TERRA, earth, in geography and aftronomy. See the article Earth.

Terra firma, in geography, is fometimes ufed for a continent, in contradiftinction to iflands.

Thus Afia, the Indies, and South America, are ufually diftinguifhed into terra firmas and iflands.

Terra a terra. Gallies, and other veffels are faid to go terra a terra, when they never go far from the coafts.

The phrafe is alfo applied, in the manege, to horfes which neither make curvets nor balotades, but run fmoothly on the ground, on a preffed gallop, only making little leaps or rifings with the fore feet.

Terra del Fogo, an ifland of South-America, from which it is feparated by the ftreights of Magellan.

Terræ filius, son of the earth, a ftudent of the univerfity of Oxford, formerly appointed, in public acts, to make jefting and fatyrical fpeeches againft the members thereof, to tax them with any growing corruptions, &c.

TERRACE, or Terras, a walk or bank of earth, raifed in a garden or court, to a due elevation, for a profpect.

Terrace is alfo applied to the roofs of houfes that are flat, and whereon one may walk; as alfo to balconies that project.

TERRACINA, a town of the Campania of Rome, in Italy, feventeen miles northweft of Gaieta.

TERRAQUEOUS, in geography, an appellation given to our globe, becaufe confifting of land and water. See the articles Earth and Sea.

TERRE-PLEIN, in fortification, denotes the horizontal fuperficies, or top, of the rampart, between the inferior talus and the banquette. It is thus called, as lying nearly level, with only a little flope inwardly, to bear the recoil of the cannon. See the article Rampart.

Terre-tenant, in law, the perfon who hath the actual poffeffion of the land: thus, if a freeholder lets out his freehold to another, to be poffeffed and occupied by him, this perfon is called the terre-tenant. See the article Tenant.

TERRELLA, μικρſοη, an appellation given to a load-ftone, when turned into a fpherical figure, and is placed fo, that its poles and equator, &c. correfpond to the poles and equator of the world; as being a juft reprefentation of the great magnetical globe which we inhabit. See the article Magnet.

Such a terrella, if nicely poifed and placed in a meridian, it was imagined, would turn about its axis once in twenty-four hours; but experience has fhewed this to be a miftake.

TERRESTRIAL, fomething partaking of the nature of earth, or belonging to the globe of the earth: thus we fay, the terreftrial globe, line, &c. See the articles Globe, Earth, Line, &c.

TERRIER, a book, or roll, wherein the feveral lands, either of a private perfon, or of a town, college, church, &c. are defcribed. It fhould contain the number of acres, and the fite, boundaries, tenants names, &c. of each piece or parcel.

Terrier is alfo ufed for a fmall hound, to hunt the fox or badger; fo called, becaufe

because he creeps into the ground, as the ferrets do into the coney-burrows, after the fox, &c. See HUNTING.

TERRING, a market-town of Sussex, situated on the English channel, twenty miles east of Chichester.

TERRIS, BONIS, ET CATALLIS RETRAHENDIS, &c. a writ which lies for a clerk, to recover his lands, goods, and chattels, formerly seised, after clearing himself of a felony.

TERRIS ET CATALLIS RETENTIS ULTRA DEBITUM LEVATUM, a judicial writ brought for restoring of lands or goods to a debtor, that is distrained above the amount of the debt due.

TERRIS LIBERANDIS, a writ that lies for a person convicted on an attaint, to bring the process before the king, and to take a fine for his imprisonment, to deliver him his lands again, and release him of the strip and waste.

TERRITORY, in geography, denotes an extent or compass of land, within the bounds, or belonging to the jurisdiction, of any state, city, or other subdivision of a country.

TERROUEN, a town of Artois, in the french Netherlands, situated on the river Lis, six miles south of St. Omers.

TERTIAN, in medicine, an ague, or intermitting fever, the fits of which return every third day; that is, there are two fits in three days, the day intervening being without any fit at all.

A regular tertian is attended with the following symptoms: at first, the head aches, the limbs seem weary, there is a pain in the loins about the first vertebræ of the back, which tends towards the epigastrium, with a painful sensation of a tension in the hypochondria, and costiveness: then comes on a coldness of the external parts, especially of the nose and ears, a stretching, yawning, shivering, and shaking, sometimes so much as to make the bed tremble under them; the pulse is small, contracted, and weak; sometimes the patient is troubled with thirst; then follows a nausea, with a fruitless reaching to vomit: and to these symptoms there succeeds an anxious burning and dry heat, which pervades the whole body; the pulse becomes full and quick, the restlessness increases, the breathing is more difficult, and the patient, with his eyes almost closed, begins to talk a little wildly. However, the duration of the fit is uncertain, continuing sometimes ten or eleven hours, and sometimes twenty-four.

As to the method of cure, it differs but little from that recommended for quartans. See the articles QUARTAN and INTERMITTENT.

TERTIATE *a great gun*, in gunnery, is to examine the thickness of the metal at the muzzle, whereby to judge of the strength of the piece, and whether it be sufficiently fortified or not. This is usually done with a pair of calliber-compasses, and if the piece be home bored, the diameter less by the height, divided by 2, is the thickness at any place.

TERVEL, a city of Arragon, in Spain, situated on the river Guadalavira, seventy-five miles south of Sarragossa: west long. 1° 20′, north lat. 40° 35′.

TERVERE, a port town of the united Netherlands, situated on the north-east coast of the island of Walcheren, four miles north-east of Middleburg.

TERUNCIUS, in roman antiquity, a very small brass-coin. See COIN.

TESCHIN, a city of Silesia, twenty-five miles south-east of Troppau: east long. 18°, and north lat. 49° 50′.

TESSELATED PAVEMENTS, those of rich mosaic work, made of curious square marbles, bricks, or tiles, called tesselæ, from their resembling dice. See MOSAIC.

TESSIN, a river of Italy, which, taking its rise in the Alps, runs through the country of the Grisons and the lake Maggior; and then, turning south-east thro' the Milanese, passes by Pavia, and falls into the Po, a little below that city.

TEST, in metallurgy, a vessel of the nature of the coppel, used for large quantities of metals at once. See COPPEL.

Tests are usually a foot and a half broad, and are made of wood-ashes, not prepared with so much care as for coppel-making, and mixed with finely powdered brick-dust; these are made into the proper shape either by means of an earthen vessel of proper dimensions, or only an iron-ring. To make them in the first manner, an earthen vessel is to be procured, not glazed within, and by its depth and breadth proportioned to the quantity of metal to be worked: the inside of this vessel is to be well moistened with fair water, that the ashes to be put into it may adhere the better. Put into this vessel, thus prepared, the ashes and brick-dust before-mentioned, and first moistened either with water alone, or with water with a little

white

white of an egg mixed in it: let the quantity of this be so much as will half fill the vessel, then press the mass with a wooden indented pestle; or, if not for a very large test, with a wooden cylinder only of an inch thick: when thus pressed down add fresh ashes, and press them in a second time, as in the making of coppels, and repeat this addition of fresh ashes till the earthen vessel is nearly full; then remove the superfluous ashes with an iron-ruler, and let the inequalities remaining at the border, be smoothed with a wooden ball rolled round about. This done, you are to cut the cavity with a bowed iron, that you may have a broad spherical segment, not very deep: and lastly, by means of a sieve, strew this cavity carefully and regularly over with dry ashes of bones of animals, ground extremely fine, and squeeze these hard in, by the rotation of the wooden ball. Thus you have a test finished, which, together with its earthen pot, must be set in a dry warm place.

To make the tests in the other manner, or by means of an iron-ring; let a ring of that metal be filled with ashes, mixed with brick-dust, and moistened as before-mentioned, in such manner that they may rise considerably above the ring; then press them strongly, either with your hands, or with an indented pestle, and afterwards, with gentle blows of a rammer, press the ashes from the circumference towards the center, in a spiral line and that in such a manner, that, after having been sufficiently pressed, they may be a small matter higher than the brink of the ring. If there are now any vacancies in the mass, empty the ring, and fill it again with more ashes; for if you should attempt to fill up these by adding, were it but ever so little ashes, the second or additional quantities, will never cohere so firmly with the first, but that they may probably separate in the operation. This done, turn the ring upside down, and on the other side, or bottom, take out the ashes to the quantity of one third part of the depth of the ring; and again fill the vacuity with the same ashes, in such a manner that there may remain no sensible cavity. When the mass is thus prepared, cut out a cavity in the larger surface of the ring, with a bowed iron, as in the former method.

TEST-LIQUOR, a liquor used by dealers in brandies, to prove whether they be genuine, or mixed with home-spirits. This liquor is nothing but a green or white vitriol, dissolved in fair water; for a few drops of it being let fall into a glass of old french brandy, will turn the whole to a purple, or fine violet colour; and by the strength or paleness of this colour, the dealers judge the brandy to be genuine or mixed, in different proportions, with home-spirits.

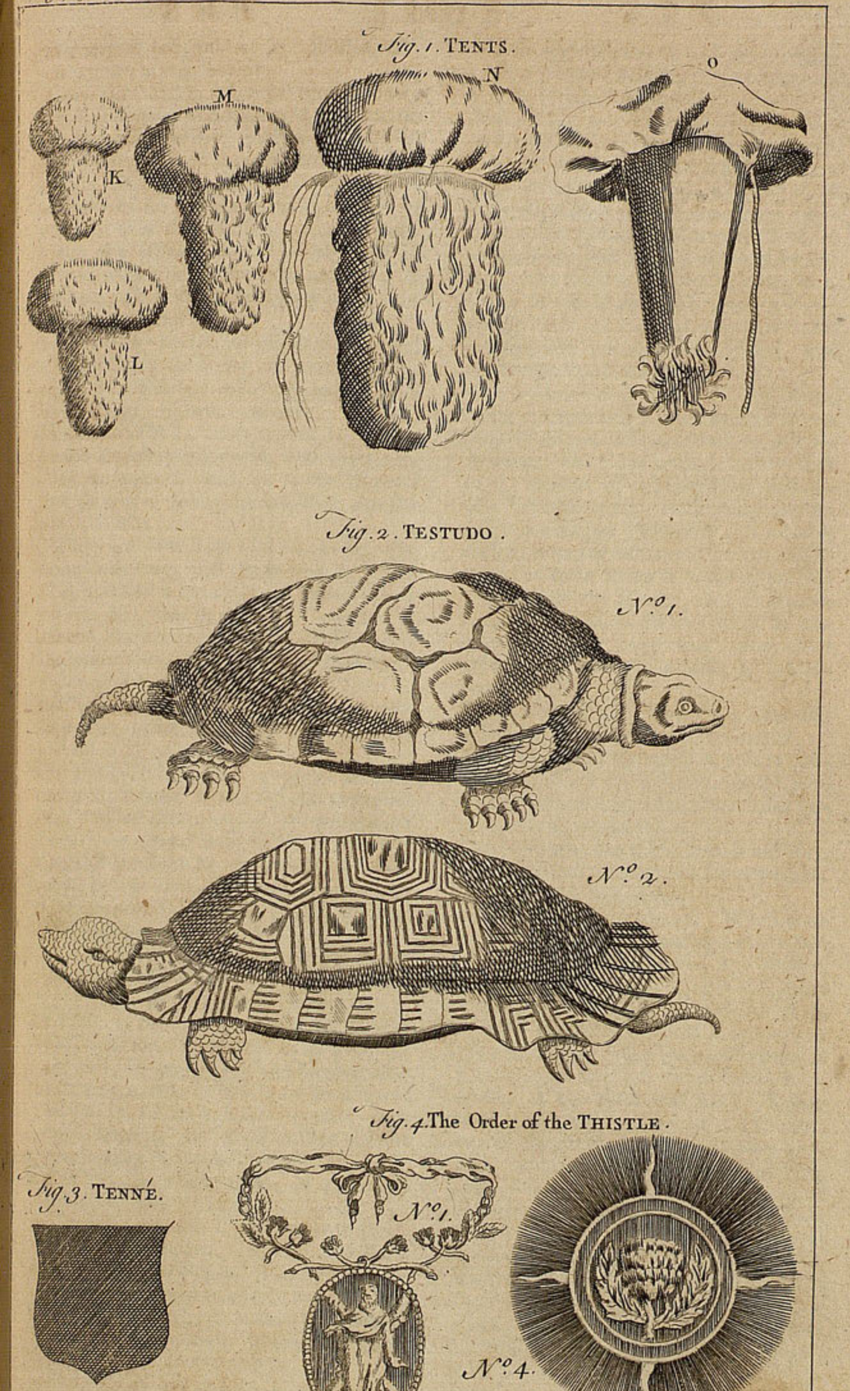
The people who use this liquor, place great confidence in it; but it is really a very vague and uncertain thing; for old french brandy, having long lain in the cask, takes a dilute tincture of the wood of the cask, that is, of oak; and this being of the same nature with a solution or tincture of galls, naturally turns bluish or blackish with vitriol. A new distilled brandy, though wholly foreign, would not give this test; and a common malt-spirit, with oak-chips infused in it, will turn as dark as the finest brandy. While our distillers, indeed, had nothing in use, for the colouring their spirits but burnt sugar, it was possible to make some guess at an adulteration with them, because the brandy, in this case, would not become blackish in proportion to its former colour, the sugar colour not turning to ink with the vitriol, like the other: but our distillers have of late found a way of using an extract of oak, for the colouring of their spirits; and, since that, this test-liquor is of very little use, our common spirits, of any kind, turning as deep with it as the foreign brandies.

The very best way of making this test-liquor, is with a calcined vitriol of iron, dissolved in a dilute or aqueous mineral acid. The liquor, when well made in this manner, is of a fine yellow colour, and will give, for a time, the finest blue to any spirituous tincture of oak.

TEST-ACT, a statute 25 Car. II. cap. 2. which requires all officers, both civil and military, to take the oaths and test, *viz.* the sacrament, according to the rites and ceremonies of the church of England; for the neglect whereof, a person executing any office, mentioned in that statute, forfeits the sum of 500l. recoverable by action of debt.

TESTACEOUS, in natural history, an epithet given to a species of fish, which are covered with a strong thick shell, as tortoises, oysters, pearl-fish, &c.

In strictness, however, testaceous is only applied to fish whose strong and thick shells are entire and of a piece: those which are soft, thin, and consist of several




J. Jefferys sculp.

ral pieces jointed, as the lobster, &c. being called crustaceous.

But, in medicine, all preparations of shells and substances of the like kind, are called testaceous powders: such are powder of crab's claws and eyes, hartshorn, pearl, &c. Dr. Quincy and others suppose the virtue of all testaceous medicines to be alike; that they seldom or never enter into the lacteals, but that the chief of their action is in the first passages; in which case they are of great use in absorbing acidities.

Hence they become of use in fevers, and especially in rectifying the many distempers in children, which generally owe their origin to such acidities.

TESTAMENT, *testamentum*, in law, a solemn and authentic act, whereby a person declares his will, as to the disposal of his estate, effects, burial, &c. See the article WILL.

There are two sorts of testaments, *viz.* one in writing, and one in words; which last is called a nuncupative testament, or will: but this is not good in case of lands, which are only deviseable by a testament in writing, executed in the life-time of the testator.

TESTATOR, or TESTATRIX, the person who makes his or her will and testament.

TESTATUM, in law, a writ in personal actions, where, if the defendant cannot be arrested on a capias, in the county where the action is laid, but is returned non est inventus by the sheriff, this writ shall be sent into any other county, where such person is thought to be, or have wherewithal to satisfy the demand.

It is called testatum, because the sheriff has, before, testified that the defendant was not to be found in his bailiwick.

TESTE, in law, a word generally used in the conclusion of every writ, wherein the date is contained, and begins with *teste meipso*, &c. in case it be an original writ; or, if only judicial, then with *teste*, naming the chief justice of the bench whence the writ issues.

TESTES, the TESTICLES, in anatomy. See the article TESTICLE.

The testes of the brain are two little, round, hard bodies, between the third and fourth ventricle, near the pineal gland. See the article BRAIN.

TESTICLE, *testis*, in anatomy, a double part in male animals, serving for generation. See GENERATION.

The testicles are two in number, of an oval or egg-like figure, and are contained in a peculiar bag, called the scrotum. See the article SCROTUM.

But besides this external covering, the testicles themselves have their coats or tunics; the first of which composes the cremaster-muscle, the office whereof is to raise the testicle; the second is the vaginalis tunica, formed of a process of the peritonæum, and laxly surrounds the testicle; the third is the tunica albuginea, which is robust and strong, and adheres closely to the substance of the testicle: this last receives the spermatic vessels, and conveys them to the testicle.

The substance of the testicles is vasculous, being composed of a great number of extremely minute vessels, called vascula seminalia; which are convoluted together in the manner of the intestines, and appear beautifully after macerating the testicles in vinegar. There is also a body, called, from the discoverer, corpus Highmori, wherein there is a cavity for the reception of the semen: this, in human subjects, is placed in the back of the testicle; but in dogs, and many other animals, it is in the middle of the testicle.

The vessels of the testicles are otherwise called spermatics. See SPERMATIC.

As to the use of the testicles, it is to produce the semen masculinum, for the purpose of generation. See the articles SEMEN and GENERATION.

Some also give the name female testicles, testes muliebres, to the ovaries of women. See the article OVARIES.

*Tumours of the* TESTICLES. When these happen from any external injury, the best application to disperse them, says Heister, are vinegar of litharge, lime-water, spirit of wine camphorated, and cerufs, tutty, or lapis calaminaris mixed in it: but in the night-time, when the applications of fomentations are not so convenient, a plaster of the mercurial kind, doubly sated with mercury; or, in slight cases, one of simple diachylon, may very properly be kept on. Internal medicines, such as nitre, and the thin decoctions of discutient medicines, are also to be used; and, if occasion call for it, bleeding in the arm is very proper.

This may be the method with tumours of these parts, from external injuries; but when they are from venereal causes, it is always necessary to give brisk purges, with the addition of a proper dose of calomel to each; and warm and weak drinks

drinks ſhould be taken frequently, by which means theſe tumours are often diſperſed. See GONORRHOEA and POX.

But if either remedies are applied too late, or the inflammation is too violent, the tumour generally ends either in a ſuppuration or gangrene. In this caſe the maturating remedies are to be applied, ſuch as warm cataplaſms, and the like; and if the tumour does not break of itſelf at a proper time, from the application of theſe, it muſt be carefully opened with the knife, and the matter being diſcharged, the wound is to be cleanſed by injecting vulnerary decoctions, and afterwards healed with balſam of Peru, or the like.

TESTICULATED, among botaniſts, an appellation given to roots compoſed of two tuberoſe knobs, reſembling teſticles: ſuch are thoſe of orchis, &c.

TESTIMONIAL, a kind of certificate, ſigned either by the maſter and a fellow of the college where the perſon laſt reſided; or by three, at leaſt, reverend divines, who knew him well for three years laſt paſt, giving an account of the virtues, uniformity, and learning of the perſon.

Teſtimonial is alſo a certificate, under the hand of a juſtice of peace, teſtifying the place and time when a ſoldier, or mariner landed, and the place of his dwelling, &c. whither he is to paſs.

There is alſo another kind of teſtimonial for the clergy, made by perſons preſent, that a clergyman has in all things complied with the act of uniformity; and to certify, that the clerk has performed what the law requires on his inſtitution and induction.

TESTIMONY, the ſame with evidence. See the articles EVIDENCE, WITNESS, and CERTITUDE.

TESTUDO, in zoology, a genus of amphibious animals, with four legs and a tail, and the body covered with a firm ſhell.

This genus comprehends all thoſe animals known in engliſh by the names of tortoiſes and turtles; of which there are a great many ſpecies, ſome with four toes on each foot; others with five toes on the fore feet, and four on the hinder ones; and others, diſtinguiſhed by other peculiarities, particularly the compartments of their ſhells, ſome being divided into irregular ſpaces, and others beautifully teſſelated. See plate CCLXXIV. fig. 2. n° 1. and 2.

The ſhells of theſe animals are much uſed in ornamental works, under the name of tortoiſe-ſhells; which, on importation, pay a duty of 1s. $\frac{92\frac{4}{5}}{100}$d. the pound; and, on exportation, draw back, 11$\frac{64\frac{4}{5}}{100}$d.

The turtle, whoſe fleſh is ſo finely flavoured, and ſo much eſteemed at table, is caught in great abundance in the american ſeas; and grows to a vaſt ſize, ſome having been found to weigh 480 pounds.

The Americans find ſo good account in catching turtle, that they have made themſelves very expert at it: they watch them from their neſts on ſhore, in moonlight nights; and, before they reach the ſea, turn them on their backs, and leave them till morning; when they are ſure to find them, ſince they are utterly unable to recover their former poſture: at other times they hunt them in boats, with a peculiar kind of ſpear, ſtriking them with it through the ſhell; and as there is a cord faſtened to the ſpear, they are taken much in the ſame manner as the whales. See the article FISHERY.

TESTUDO, in antiquity, was particularly uſed among the poets, &c. for the antient lyre; by reaſon it was originally made by its inventor, Mercury, of the black or hollow ſhell of the teſtudo aquatica, or ſea-tortoiſe, which he accidentally found on the banks of the river Nile. See the article LYRE.

TESTUDO, in the military art of the antients, was a kind of cover or ſcreen which the ſoldiers, *e. gr.* a whole company, made themſelves of their bucklers, by holding them up over their heads, and ſtanding cloſe to each other. This expedient ſerved to ſhelter them from darts, ſtones, &c. thrown upon them, eſpecially thoſe thrown from above, when they went to the aſſault.

TESTUDO was alſo a kind of large wooden tower which moved on ſeveral wheels, and was covered with bullocks-hides flead, ſerving to ſhelter the ſoldiers when they approached the walls to mine them, or to batter them with rams.

It was called teſtudo, from the ſtrength of its roof, which covered the workmen as the ſhell does the tortoiſe.

TESTUDO *veliformis quadrabilis*, a hemiſpherical vault, or cieling of a church, wherein four windows are ſo contrived, as that the reſt of the vault is quadrable, or may be ſquared. See VAULT.

The determining of thoſe windows was a problem propoſed to the great mathematicians

ticians in Europe, particularly the cultivators of the new calculus differentialis in the Acta Eruditorum Lipsiæ, by Sig. Viviani, under the fictitious name of A. D. pio lisci pusillo geometra, which was the anagram of postermo Galilæi discipulo.

It was solved by several persons, particularly Mr. Leibnitz, the very day he saw it: and he gave it in the Leipsic acts in an infinity of manners; as also did M. Bernouilli, the marquis de l'Hospital, Dr. Wallis, and Dr. Gregory.

TETANUS, in medicine, is a convulsive motion that makes any part rigid and inflexible. See CONVULSION.

TETBURY, a market town, sixteen miles south of Gloucester.

TETHYS, in ichthyology, a genus of fish of the order of the zoophytæ, the body of which is formed as it were of two lips of an oblong cartilaginous body; between them there are four tentacula, which have the form of ears, and two perforations in most species near the tentacula.

TETICACO, a great lake of Peru, more than two hundred miles in circumference: the towns situated on this lake are esteemed the most delightful in all South America.

TETRACERA, in botany, a genus of the polyandria-tetragynia class of plants, without any flower petal: the fruit is composed of four oval capsules, formed each of a single valve, opening by a suture in the upper part, and containing only one cell, with numerous, roundish, and covered seeds.

TETRACHORD, in the antient music, a concord consisting of four degrees or intervals, and four terms or sounds; called also by the antients diatessaron, and by us a fourth. See INTERVAL, DIAGRAM, DIATESSARON, and FOURTH.

This interval had the name tetrachord given it, with respect to the lyre and its chords or strings.

TETRADECARHOMBIS, in natural history, the name of a genus of fossils, of the class of the selenitæ, expressing a rhomboidal body, consisting of fourteen planes. See the article SELENITÆ.

The characters of this genus are, that the bodies of it are exactly of the same form with the common selenitæ; but that in these each of the end-planes is divided into two, and there are, by this means, eight of these planes instead of four. Of this genus there are only three known species. 1. A thin, pellucid one, with transverse filaments, which is frequent in the clay pits of Northamptonshire, and some other counties. 2. A dull, thicker kind, with very slender, transverse filaments: this is a very rare species, and found, as far as is yet known, only in Leicestershire in the yellow brick-clay, and at small depths. And, 3. A large scaly kind, considerably long, and of a very rough surface: this is found in Yorkshire, and that sometimes loose, on the sides of the hills, but more frequently buried in the strata of clay.

TETRADIAPASON, a musical chord, otherwise called a quadruple diapason, or eighth. See the article DIAPASON.

TETRADITÆ, a name given to several different sects of heretics. The sabbathians were called tetraditæ, from their keeping Easter-day on the fourth day, or on Wednesday. The manichees, and others who admitted of a quaternity instead of a trinity in the Godhead, were also called tetraditæ. The followers of Petrus Fullensis had the same appellation, by reason of the addition they made to the trisagion, to support an error they held, that in our saviour's passion it was not any particular person of the Godhead that suffered, but the whole deity.

TETRADYNAMIA, in botany, a class of plants, whose flowers have four of their stamina of more efficacy than the rest: these are always known by having the four efficacious stamina longer than the rest. The tetradynamia of Linnæus include those called by Tournefort cruciformes, and by Ray, siliquosæ, and siliculosæ.

The general characters of which are these: the perianthium is of an oblong figure, and is composed of four leaves, which are oval, oblong, hollow, obtuse, and converging toward one another, and are gibbous at the base; these all fall off with the flower, and stand in pairs; the opposite ones being always equal in length, this cup is properly the nectarium of the plant, and it is on this occasion that it is gibbous at the base. The flower is of that kind, called by Tournefort, cruciform; it consists of four equal petals, which have ungues of the length of the cup, erect, and flat; the petals are broad at the top, and obtuse, and scarce touch one another at the sides; and the insertion of the petals and of the stamina is in the same place.

The stamina are six subulated erect filaments, the two opposite ones are of the



length

length of the cup, the other four are fomething longer, and are of a lefs length however than the petals. The antheræ are oblong and pointed, thick at the bafe and erect, with apices bending fideways. The nectariferous gland in the different genera of this clafs, is differently fituated. It ufually, however, is found near the ftamina, and moft frequently of all is affixed to fome fhort filaments, and ftands near their bafe. Two of the ftamina are often curved, that they may not prefs upon this gland; and it is often owing to this, that two are fhorter than the reft. The germen of the piftil is placed above the receptacle, and is every day in its growth raifed higher and higher. The ftyle is fometimes wanting, but in fuch plants as have it, it is of the length of the longer ftamina. The ftigma is always obtufe.

The fruit or capfule is always a bivalve pod, which often contains two cells; this, when ripe, opens by fplitting from the apex to the bafe, and it has always a little membranous fubftance ferving within as a feptem, when the pod is bilocular; this ftands out beyond the apex, and is the rudiments of what was before the ftyle. The feeds are roundifh, and the pod ufually narrow and oblong.

This is a very natural clafs of plants, and has been received as fuch under whatever name by all the fyftematical writers in botany: and the plants contained under it are generally fuppofed to be all antifcorbutics.

It is naturally fubdivided into two feries; the one containing the filiculofe plants, and the other the filiquofe: the firft have a fhort pod, the others a long and flender one: the firft pods ufually have more of the remains of the ftyle than the others.

TETRAEDRON, or TETRAHEDRON, in geometry, one of the five regular or platonic bodies or folids, comprehended under four equilateral and equal triangles. See plate CCLXXV. fig. 3.

It is demonftrated by mathematicians, that the fquare of the fide of a tetraedron is to the fquare of the diameter of a fphere, wherein it may be infcribed, in a fubfequialteral ratio: whence it follows, that the fide of a tetraedron is to the diameter of a fphere it is infcribed in, as $\sqrt{2}$ to the $\sqrt{3}$, confequently they are incommenfurable.

TETRAGON, in geometry, a general name for any fourfided figure, as a fquare, parallelogram, rhombus, or trapezium. See PARALLELOGRAM, &c.

TETRAGON, in aftrology, an afpect of two planets with regard to the earth, more ufually called quartile. See the article QUARTILE.

TETRAGONIA, in botany, a genus of the icofandria-tetragynia clafs of plants, without any corolla: the fruit is a coriaceous cruft, formed into a fort of fquare figure by four longitudinal alæ, and contains a fingle offeous feed with four cells.

TETRAGONOTHECA, in botany, a genus of the fyngenefia-polygamia-fuperflua clafs of plants, with a compound radiated flower, a paleaceous receptacle, and no down to the feeds.

TETRAGONIAS, a name given to a meteor, whofe head is of a quadrangular figure, and its tail or train long, thick, and uniform.

TETRAGONISM, in geometry, a term ufed by fome for the quadrature of a circle.

TRTRAGONUS, in anatomy, a mufcle otherwife called quadratus genæ. See the article QUADRATUS.

TETRAGRAMMATON, a denomination given by the Greeks to the hebrew name of God, Jehovah, becaufe confifting of four letters.

TETRAMETER, in antient poetry, an iambic verfe, confifting of four meafures, or eight feet. This kind of verfe is only found in the comic poets, as Terence, &c. See the article IAMBIC.

TETRANDRIA, in the Linnæan fyftem of botany, a clafs of plants, the fourth in order; comprehending all fuch plants as have hermaphrodite flowers, with four ftamina, or male-parts, in each. See the article BOTANY.

TETRAO, in ornithology, a genus of birds, of the order of the gallinæ, diftinguifhed by having the part of the forehead over the eyes naked and papillofe.

This genus comprehends the urogallus major, or wood-cock; the urogallus minor, or growfe; the moor-cock, lagopus, &c. See UROGALLUS, &c.

TETRAHEDRON, or TETRAEDRON. See the article TETRAEDRON.

TETRAPETALOUS, in botany, an epithet given to flowers that confift of four fingle petala or leaves, placed around the piftil. See the article PISTIL.

TETRAPHARMACUM, fignifies any remedy confifting of four ingredients.

TETRAP-

TETRAPLA, in church hiftory, a bible difpofed by Origen under four columns, in each whereof was a different greek verfion, *viz.* that of Aquila, that of Symmachus, that of the Seventy, and that of Theodotion. See BIBLE.

TETRAPTERA, in the hiftory of infects, a name given to that order of infects, which have four wings. See the article INSECT.

The infects of this order are very numerous, and have certain evident diftinctions in the ftructure of their wings, and are thence arranged under five claffes; *viz.* the coleoptera, fcleroptera, neuroptera, lepidoptera, and hyrnenoptera. See the article COLEOPTERA, *&c.*

TETRAPTOTE, *tetraptoton*, in grammar, a name given to fuch defective nouns as have only four cafes; fuch are *vicis*, *pecudis*, *fordis*, &c. as being deprived of the nominative and vocative fingular.

TETRAPYRAMIDIA, in natural hiftory, the name of a genus of fpars, influenced in their fhape by an admixture of particles of tin, and found in form of broad-bottomed pyramids of four fides. See the article SPAR.

Of this genus there is only one known fpecies, which is ufually of a brownifh colour, and found in Saxony, as alfo in Devonfhire, Cornwall, and other counties of England, where there is tin.

TETRARCH, *tetrarcha*, a prince who holds and governs a fourth part of a kingdom. Such originally was the import of the title tetrarch; but it was afterwards applied to any petty king or fovereign, and became fynonymous with ethnarch.

TETRASTICH, a ftanza, epigram or poem, confifting of four verfes.

TETRASTYLE, in the antient architecture, a building, and particularly a temple, with four columns in its front.

TETRASYLLABICAL, a word confifting of four fyllables.

TETRATONON, in mufic, a name whereby the fuperfluous fifth is fometimes, called, as containing four tones.

TETUAN, a town of the empire of Morocco, fituated about eight miles from the bay of that name, juft within the ftraits of Gibraltar: weft long. 6° 35′, north lat. 35° 40′.

TEUCRIUM, in botany, a genus of the didynamia-gymnofpermia clafs of plants, the corolla whereof is ringent, and formed of a fingle petal: the tube is cylindric and fhort, and terminates in an incurvated opening: the lower lip is divided into three fegments; the lateral ones are of the figure of the upper lip, and fomewhat erect; the middle one is much larger and rounded: there is no pericarpium; the feeds are four, roundifh, and lodged in the bafe of the cup.

This genus comprehends the germander, polium, fcordium, *&c.* This plant has the credit of being a great fudorific and alexipharmic. It is prefcribed in malignant and peftilential fevers, and in the plague itfelf, as alfo in obftructions of the liver and fpleen; it is faid to deftroy worms externally; it cleanfes ulcers, and is applied by way of cataplafm to mitigate pain; it is at prefent chiefly ufed in the fhops as an ingredient in the confectio Fracaftorii.

TEUTONIC, fomething belonging to the Teutons, an antient people of Germany, inhabiting chiefly along the coafts of the German ocean: thus, the teutonic language is the antient language of Germany, which is ranked among the mother tongues. The teutonic is now called the German or Dutch, and is diftinguifhed into upper and lower. The upper has two notable dialects, *viz.* 1. The Scandian, Danifh, or perhaps Gothic; to which belong the languages fpoken in Denmark, Norway, Sweden, and Iceland. 2. The Saxon, to which belong the feveral languages of the Englifh, Scots, Frifian, and thofe on the north of the Elbe. To the lower belong the Low Dutch, Flemifh, *&c.* fpoken through the Netherlands, *&c.*

TEUTONIC ORDER, a military order of knights, eftablifhed towards the clofe of the twelfth century, and thus called as confifting chiefly of Germans or Teutons. The origin, *&c.* of the teutonic order is faid to be this. The Chriftians, under Guy of Lufignan, laying fiege to Acre, or Acon, a city of Syria, on the borders of the Holy Land, fome Germans of Bremen and Lubec, touched with compaffion for the fick and wounded of the army, who wanted common neceffaries, fet on foot a kind of hofpital under a tent, which they made of a fhip's fail, and here betook themfelves to a charitable attendance on them. This ftarted a thought of eftablifhing a third military order, in imitation of the templars and hofpitallers. The defign was approved of by the patriarch of Jerufalem, the archbifhops and bifhops of the neighbouring places, the king of Jerufalem, the mafters of the temple

temple and hofpital, and the german lords and prelates then in the Holy Land, and pope Calixtus III. confirmed it by his bull, and the new order was called the order of teutonic knights of the houfe of St. Mary at Jerufalem. The pope granted them all the privileges of the templars and hofpitalers of St. John, excepting that they were to be fubject to the patriarchs and other prelates, and that they fhould pay tythe of what they poffeffed. Others relate, that the teutonic order was eftablifhed at Jerufalem, before the city of Acre was befieged. The officers of the teutonic order, while in its fplendor, were the grand mafter, who refided at Marienburg; under him were the grand commander; the grand marfhal, who had his refidence at Koningfberg; the grand hofpitaler, who refided at Elbing; the draper, who took care to furnifh the habits; the treafurer, who lived at the court of the grand mafter, and feveral commanders, as thofe of Thorne, Culme, Brandenburg, Koningfberg, Elbing, &c. They had alfo their commanders of particular caftles and fortreffes, advocates, proveditors, intendants of mills, provifions, &c. This order is now little more than the fhadow of what it formerly was, having only three or four commanderies, fcarce fufficient for the ordinary fubfiftence of the grand mafter and his knights.

TEWKSBURY, a borough-town of Glocefterfhire, fituated on the river Severn, ten miles north of Glocefter.

It fends two members to parliament.

TEXEL, an ifland of Holland, fituated at the entrance of the Zuyder-fea, parted from the continent of Holland by a narrow channel, through which moft fhips bound to Amfterdam pafs.

TEXT, a relative term, contradiftinguifhed to glofs or commentary, and fignifying an original difcourfe exclufive of any note or interpretation. This word is particularly ufed for a certain paffage of fcripture, chofen by a preacher to be the fubject of his fermon.

A text-book, in feveral univerfities, is a claffic author written very wide by the ftudents, to give room for an interpretation dictated by the mafter or regent to be inferted in the interlines. The Spaniards give the name of text to a kind of little poem or fet of verfes placed at the head of a glofs, and making the fubject thereof, each verfe being explained one after another in the courfe of the glofs.

Text, in antient law-authors, is appropriated to the book of the four gofpels by way of eminence.

TEXTUARIES, *textuarii*, a name given the fect of the caraites among the Jews. See the article CARAITES.

TEXTURE, *textura*, properly denotes the arrangement and cohefion of feveral flender bodies or threads interwoven or entangled among each other, as in the webs of fpiders, or in cloths, ftuffs, &c.

Texture is alfo ufed in fpeaking of any union or conftituent particles of a concrete body, whether by weaving, hooking, knitting, tying, chaining, indenting, intruding, compreffing, attracting, or any other way. In which fenfe we fay a clofe compact texture, a lax porous texture, a regular or irregular texture, &c. A great deal depends on the texture of the component parts of a body; hence moft of its particular properties, its fpecific gravity, colour, &c.

TEYN, a town of Bohemia, fituated fifty miles fouth-weft of Prague.

THALAMI *nervorum opticorum*, in anatomy, two oblong prominences of the lateral ventricles of the brain, medullary without, but a little cineritious within, being thus called becaufe the optic nerves rife out of them.

THALIA, in botany, a genus of plants, the characters of which are not perfectly afcertained: the calyx is an ovato-fubulated univalve fpatha: the corolla confifts of five ovato-oblong petals, hollowed and undulated at the edge; the two neareft the fpatha are fmall and involute, the others are nearly equal, erect, and concave: the germen is oval: the fruit is an oval unilocular berry: the feed is fingle, offeous, and bilocular; the nucleus is flender.

THALICTRUM, COMMON MEADOW RUE, in botany, a genus of the polyandria-polygynia clafs of plants, the corolla whereof confifts of four roundifh, hollow, obtufe, deciduous petals. The fruit confifts of a carinated, fulcated bark, containing only one cell: the feed is fingle and oblong.

This plant is an excellent aperient and ftrengthener of the inteftines, like rhubarb: but the dofe ought to be triple that of rhubarb. It is commonly faid to purge bile: the flowers are effectual in fpitting of blood, the fluor albus, and other female diforders; externally they are of fervice in the fcabies, all cutaneous difeafes, wounds and ulcers.

THAMES, a great navigable river of England, composed chiefly of the river Isis and Thame, of which the Isis is much the largest and runs the longest course, rising on the confines of Glocestershire. At Lechlade it becomes navigable, from whence it continues its course north-east to Oxford, where it receives the Charwell: from Oxford it runs south-east to Abington, and so to Dorchester, where it receives the Thame, and continues it course south-east to Windsor, and thence runs east to London, and continues the same course to the sea, receiving the river Medway near the mouth of it. The Thame is but a small river, which rising near Tring in Hertfordshire, crosses the county of Bucks, and falls into the Isis at Dorchester.

THANE, or Thain, *thanus*, a name of an antient dignity among the English and Scots, or Anglo Saxons. Skene makes thane to be a dignity equal to the son of an earl. Camden will have it, that thanes were only dignified by the offices they bore. There were two kinds or orders of thanes, the king's thanes, and the ordinary thanes: the first were those who attended the king in his courts, and who held lands immediately of the king. The ordinary thanes, or the thani minores, were the lords of the manors, who had particular jurisdiction within their limits, and over their own tenants; these changed their names for that of barons, and hence their courts are called courts-baron to this day.

Thane-lands, were lands granted by charters of our antient kings, to their thanes, with all immunities, except the threefold necessity of expedition, repair of castles, and mending bridges.

THANET, a little island of east Kent, formed by the branches of the Stour and the sea.

THAPSIA, deadly carrot, in botany, a genus of the pentandria digynia class of plants, the general corolla whereof is uniform: the single flowers consist each of five crooked, lanceolated petals: the fruit is naked, oblong, surrounded longitudinally with a membrane, and separable into two parts: the seeds are two, large, oblong, and convex, pointed at each end, and having on each side a plane margin, large and undivided, which is emarginated at top and bottom.

This plant is used to provoke the menses, and other evacuations, and externally it is used in ointments for the itch, and the like cutaneous disorders.

THAUMATURGUS, a worker of miracles, an appellation which the romanists give to several of their saints eminent for the number and greatness of their miracles.

THAWING, the resolution of ice into its former fluid state, by the warmth of the air, &c. See Freezing.

Boerhaave observes, that if a sudden thaw takes place after a long sharp frost, which has bound up the rivers, and penetrated the earth's surface to a considerable depth, it is, usually, quickly succeeded by a multitude of clouds and uncommon heats, and then by thunder and lightening. The reason is, that the fat vapours and exhalations raised by the subterraneous heat, have long remained imprisoned under that covering of the earth, as appears hence, that if the ice of a ditch be broke in the middle of a severe frost, it presently emits warm vapours, and this the more plentifully, as well as the hotter, by how much the frost is harder and the ice thicker. As soon, therefore, as the exterior frozen turf of earth is softened by warmth, the pent-up vapours immediately escape through all the passages they can find, and mounting on high, form clouds, which being driven about, and sometimes illumined by the sun, produce such effects. Hence these violent thunders in Muscovy, Sweden, and Denmark, after a thaw.

THAXTED, a market-town of Essex, situated 18 miles north of Chelmsford.

THEA, tea, in botany. See Tea.

THEATINES, a religious order in the romish church, so called from their principal founder John Peter Caraffa, then bishop of Theate, or Chiete, in the kingdom of Naples, and afterwards pope, under the name of Paul IV. The names of the other founders were Gaetan, Boniface, and Consiglieri. These four pious men desiring to reform the ecclesiastical state, laid the foundation of an order of regular clerks at Rome, in the year 1524. Pope Clement VII. approved the institute, and permitted the brethren to make the three religious vows, to elect a superior every three years, and to draw up statutes for the regulation of the order. They first endeavoured, by their example, to revive among the clergy the poverty of the apostles and first disciples of our Saviour, and were the first who assumed the title of regular clerks.

THEATRE, θεατρον, in antiquity, a public

lic edifice for the exhibiting of fcenic fpectacles, or fhews, to the people; comprehending not only the eminence on which the actors appeared, and the action paffed, but alfo the whole area of the place, common to the actors and fpectators.

The Romans borrowed the form of their theatres from thofe of the Greeks, which were generally built in the fhape of a femi-circle, encompaffed with porticos, and furnifhed with feats of ftone, difpofed in femi-circles, rifing gradually one above another.

The principal parts of the antient theatres were the fcena, profcenium, orcheftra, and area. See the articles SCENA, PROSCENIUM, &c.

Among the moderns, theatre more peculiarly denotes the ftage, or place whereon the drama or play is exhibited; anfwering to the profcenium of the antients. It is alfo ufed, in a more comprehenfive fenfe, for the whole play-houfe. See the articles DRAMA, PLAY, &c.

THEATRE is alfo ufed in architecture, chiefly among the Italians, for an affemblage of feveral buildings, which, by a happy difpofition and elevation, reprefents an agreeable fcene to the eye.

*Anatomical* THEATRE, in a fchool of medicine and chirurgery, is a hall, with feveral rows of feats, difpofed in the circumference of an amphitheatre; having a table bearing on a pivot, in the middle, for the diffection of bodies.

THEBAID, *thebais*, a celebrated heroic poem of Statius, the fubject whereof is the civil war of Thebes, between the two brothers Eteocles and Polynices; or, Thebes taken by Thefeus.

The thebaid is cenfured by the beft of critics, for a multiplicity of fables and actions; for too much heat and extravagance, and for going beyond the bounds of probability.

THEBES, the name of an ancient city in upper Egypt, now in ruins; as alfo an antient city of Achaia, now a province of european Turky.

THEFT, *furtum*, in law, an unlawful felonious taking away another man's moveable and perfonal goods, againft the owner's will, with intent to fteal them.

It is divided into theft or larceny, properly fo called, and petit theft, or petit larceny; the former whereof is of goods above the value of 12 d. and is deemed felony; the other, which is of goods under that value, is not felony. See the articles FELONY and LARCENY.

THEFTBOTE, the receiving a man's goods again from a thief, or other amends, by way of compofition, and to prevent profecution, that the felon may efcape unpunifhed; the punifhment whereof is imprifonment, but not the lofs of life or member.

THEISM, or DEISM. See DEISM.

THELIGONUM, in botany, a genus of the monoecia-polyandria clafs of plants, having no corolla: the calyx is bifid, and the piftil fingle: the fruit is a coriaceous capfule, containing only a fingle cell, and in it one globofe feed.

THELONIUM, in law-books, is ufed to denote any kind of toll: hence, citizens and other perfons who have a right to be free from toll, may have a writ called breve effendi quieti de thelonio.

THEME, in matters of education, denotes the fubject of an exercife, for young ftudents to write or compofe on.

THEME, among aftrologers, denotes the figure reprefenting the ftate of the heavens for any time required; that is, the places of the ftars and planets for that time. See the article HOROSCOPE.

THENAR, in anatomy, the abductor-mufcle of the thumb: it has its origin in the tranfverfe ligament that joins the bones of the carpus, and its termination in the firft and fecond phalanx: the two fefamoide bones of the thumb are ufually found lodged in the tendon of this mufcle. The abductor-mufcle of the great toe, likewife called thenar, has its origin from the internal fide of the calcaneum, and the os naviculare; and its termination at the internal fide of the great toe, befide the internal fefamoide bone.

THEOBROMA, the CHOCOLATE-NUT-TREE, in botany, a genus of the polyadelphia-pentandria clafs of plants, the corolla of which confifts of five erecto-patent petals, each of them armed with a bifid feta: the nectarium is of a campanulated figure, and erecto-patent: the fruit is a woody cortex, of an unequal furface, with five ridges, and has feeds lodged in five feriefes within it: thefe are numerous, flefhy, nearly of an oval figure, and ferve to make chocolate. See the article CHOCOLATE.

This genus comprehends the cacao of Tournefort, and the guazuma of Plumier; the former of which has a quadrangular pod, lengthened at each extremity; and the latter, a globofe fruit, covered with tubercles, and its rind perforated in the manner of a fieve. See CACAO.

THEOCRACY, θεοκρατεια, in matters of government, a ftate governed by the immediate direction of God alone: fuch was the antient government of the Jews, before the time of Saul.

THEODOLITE, a mathematical inftrument much ufed in furveying, for the taking of angles, diftances, &c.

It is made varioufly, feveral perfons having their feveral ways of contriving it, each more fimple and portable, more accurate and expeditious than others. The common one confifts of a brafs-circle about a foot diameter, cut in the form reprefented in plate CCLXXV. fig. 1. n° 1. having its limb divided into 360 degrees, and each degree fubdivided, either diagonally, or otherwife, into minutes.

Underneath, at *c c*, are fixed two little pillars *b b* (*ibid.* n° 2.) which fupport an axis, whereupon is fixed a telefcope confifting of two glaffes, in a fquare brafs-tube, for the viewing of remote objects.

On the center of the circle moves the index C, which is a circular plate, having a compafs in the middle whofe meridian line anfwers to the fiducial line *a a*: at *b b*, are fixed two pillars to fupport an axis which bears a telefcope like the former, whofe line of collimation anfwers to the fiducial line *a a*. At each end of either telefcope, is fixed a plain fight for the viewing nearer objects.

The ends of the index *a a* are cut circularly, to fit the divifions of the limb B; and when that limb is diagonally divided, the fiducial line, at one end of the index, fhews the degrees and minutes upon the limb. The whole inftrument is mounted with a ball and focket, upon a three-legged ftaff.

Moft theodolites have no telefcopes, but only four plain fights, two of them faftened on the limb, and two on the ends of the index.

Mr. Siffon's improved theodolite being one of the beft of thefe inftruments, we fhall here give its defcription, *ibid.* n° 3. The three ftaves, whereby it is fupported, fcrew into bell-metal joints by brafs-ferrils at top, which are moveable between brafs-pillars fixed in a ftrong brafs-plate; in which, round the center, is fixed a focket with a ball moveable in it, and upon which the four fcrews prefs that fet the limb horizontal. Next above is fuch another plate, through which the faid fcrews pafs, and on which round the center is fixed a fruftum of a cone of bell-metal, whofe axis, being connected with the center of the ball, is always perpendicular to the limb, by means of a conical brafs ferril fitted to it, whereon is fixed the compafs-box, and on it the limb, which is a ftrong bell-metal ring, whereon are moveable three brafs indexes, in whofe plate are fixed four brafs-pillars, that joining at top, hold the center-pin of the bell-metal double fextant, whofe double index is fixed in the center of the fame plate. Within the double fextant is fixed the fpirit-level, and over it the telefcope. See the article LEVEL.

The compafs-box is graved with two diamonds for north and fouth, and with 20 degrees on both fides of each, that the needle may be fet to the variation, and its error alfo known.

The limb has two fleur-de-luces againft the diamonds in the box, and is curioufly divided into whole degrees, and numbered to the left hand at every 10° to twice 180°, having three indexes (with Nonius's divifions on each for the decimals of a degree) that are moved by a pinion fixed below one of them without moving the limb, and in another is a fcrew and fpring under, to fix it to any part of the limb: it has alfo divifions numbered for taking the quarter girt in round timber; to which a fhorter index is ufed, having Nonius's divifions for the decimals of an inch; but an abatement muft be made for the bark, if not taken off. See RULE.

The double fextant is divided on one fide from under its center (when the fpirit-tube and telefcope are level) to above 60 degrees each way, and numbered at 10, 20, &c. And the double index (through which it is moveable) fhews on the fame fide the degree and decimal of any altitude, or depreffion to that extent, by Nonius's divifions; on the other fide are divifions numbered for taking the upright height of timber, &c. in feet, when diftant ten feet, which at 20 muft be doubled, and at 30 trebled; and alfo the quantities for reducing hypothenufal lines to horizontal: it is moveable by a pinion fixed in the double index. See the article SURVEYING.

The telefcope is a little fhorter than the diameter of the limb, that a fall may not hurt it; yet it will magnify as much, and fhew a diftinct object as perfect, as moft of treble its length: in its focus are very fine crofs wires, whofe interfection is

is in the plane of the double sextant, and this was a whole circle, and turned in a lathe to a true plane, and is fixed at right-angles to the limb; so that whenever the limb is set horizontal (which is readily done by making the spirit-tube level over two screws, and the like over the other two) the double sextant and telescope are moveable in a vertical plane, and then every angle taken on the limb (though the telescope be never so much elevated or depressed) will be an angle in the plane of the horizon, and this is absolutely necessary in the plotting an horizontal plane. See PLOTTING and TELESCOPE.

The use of the theodolite is abundantly shewn in that of the graphometer, or semi-circle, which is only half a theodolite; and in that of the plain table, which is occasionally made to be used as a theodolite. Note, the index and compass of a theodolite, likewise serve for a circumferentor, and are used as such. See the articles GRAPHOMETER, PLAIN-TABLE, and CIRCUMFERENTOR.

THEOGONY, that branch of the heathen theology, which taught the genealogy of their gods. See the article GOD.

THEOLOGIUM, in the antient theatre, a kind of little stage, above that whereon the ordinary actors appeared; being the place where the machinery of the gods were disposed; whence the name.

THEOLOGY, or DIVINITY, a science which instructs us in the knowledge of God, or divine things; or which has God, and the things he has revealed, for its object. See the article GOD.

Hence theology may be distinguished into natural, which comprehends the knowledge we have of God from his works, by the light of reason alone; and supernatural, which contains what we are taught concerning God in revelation.

Theology is again distinguished into positive, moral, and scholastic. Positive theology is the knowledge of the holy scriptures, and of the signification thereof, conformably to the opinions of the fathers and councils, without the assistance of any argumentation. Some will have it, that this ought to be called expositive, rather than positive. Moral theology, is that which teaches us the divine laws relating to our manners and actions. Scholastic, or school theology, is that which proceeds by reasoning; or that derives the knowledge of several divine things from certain established principles of faith.

THEONVILLE, a city of Luxemburg, situated on the river Moselle: east long. 6°, north lat. 49° 32′.

THEOPHRASTA, in botany, a genus of the pentandria-monogynia class of plants, with a monopetalous campanulated petal, semi-quinquifid at the limb: the fruit is a large, globose, unilocular capsule, containing a great many roundish seeds.

THEORBA, THIORBA, or TIORBA, a musical instrument made in form of a large lute, except that it has two necks or juga, the second and longer whereof sustains the four last rows of chords which are to give the deepest sounds.

THEOREM, a speculative proposition, demonstrating the properties of any subject.

Theorems are either universal, which extend to any quantity, without restriction universally; as this, that the rectangle of the sum, and difference of any two quantities, is equal to the difference of their squares: or particular, which extend only to a particular quantity; as this, in an equilateral right-lined triangle, each of the angles is 60 degrees.

Theorems are again distinguished into negative, local, plane, and solid.

A negative theorem is that which expresses the impossibility of any assertion; as that the sum of two biquadrate numbers cannot make a square number. A local theorem is that which relates to a surface; as, that the triangles of the same base and altitude are equal. A plane theorem is that which either relates to a rectilinear surface, or to one terminated by the circumference of a circle; as that all angles in the same segment of a circle are equal. And a solid theorem is that which considers a space terminated by a solid line; that is by any of the three conic sections. *e. gr.* this: that if a right lines cut two asymptotic parabola's, its two parts terminated by them shall be equal.

*Reciprocal* THEOREM, is one whose converse is true; as that, if a triangle have two equal sides, it must have two equal angles; the converse of which is likewise true, that, if it have two equal angles, it must have two equal sides.

THEORETIC, or THEORETICAL, something relating to theory, or that terminates in speculation. See THEORY.

Hence theoretical astronomy is that part of astronomy, which accounts for the various phænomena of the stars and planets. See STAR and PLANET.

THEORY,

THEORY, in general, denotes any doctrine which terminates in speculation alone, without considering the practical uses and application thereof. Thus the theory of chemistry, for instance, contains all the general truths which the particular experiments of chemists have hitherto demonstrated. These are, on this occasion, to be taken for granted, and the whole body of such truths makes the universal theory of chymistry, for chemistry is no science formed *a priori*; it is no production of the human mind, or raised by reasoning, but collected *a posteriori* from experiments: it took its rise from various operations casually made, and observing those that had one and the same uniform tendency, without any expectation of what followed; and was only reduced into an art, by collecting and comparing the effects of such uncertain experiments, and noting the tendency thereof: so far then as a number of experiments agree to establish any unquestionable truth; so far they may be considering as constituting the theory of chemistry. See CHEMISTRY.

Such a theory is necessary to be premised to every art; and something equivalent to this is practised by every artisan, in teaching his disciple how to proceed orderly in the exercise of his art; and accordingly it would be impossible to teach the practice of chymistry to advantage, without having first given some such theory. Thus it would be to little purpose, to give a novice a parcel of rosemary, for instance, and bid him, without any addition, distil a water from it, which should contain the natural taste and odour of the plant; unless he knew before-hand this general truth, that plants, exposed to a gentle heat, like that of the summer's sun, do exhale their most subtle and volatile parts, which, being collected and condensed by means of proper vessels, appear in form of water, and are the thing required.

THERAPEUTÆ, a term applied to those who are wholly employed in the service of religion. This general term has been applied to particular sects of men, concerning whom there have been great disputes among the learned.

It is generally supposed that St. Mark established a particular society of christians about Alexandria, of whom Philo gives an account, and calls them Therapeutæ. He speaks of them as a particular sect, retired from the world, who spent their time in reading the writings of antient authors, in singing hymns and songs composed by some of their own sect, and in dancing together the whole night. Scaliger maintains, they were Essene Jews; but Valesius rejects this opinion of Scaliger, 1. Because Philo never calls them Essenes. 2. Because there were no Essenes but in the holy land; whereas the Therapeutæ were spread through Greece, and all the barbarous nations. 3. Because Josephus, who gives a very ample account of the Essenes, does not say one word of the Therapeutæ.

THERAPEUTICE, THERAPEUTICS, that part of medicine which acquaints us with the rules that are to be observed, and the medicines to be employed in the cure of diseases. See the article DISEASE.

THERAPHIM, or TERAPHIM, certain images, or superstitious figures mentioned in scripture. Some jewish writers tell us, the theraphim were effigies of human heads, placed in niches, and consulted as oracles. Others say, they were talismans, or figures of metal, cast and engraved under certain aspects of the planets; to which they ascribed extraordinary effects. All the eastern people are much addicted to this superstition; and the Persians still call them telefin, a name nearly approaching to theraphim.

The learned Spencer makes the word theraphim to be the same as seraphim, by change of the S into T: whence it follows, that these images were representations of these angels called seraphim. M. Jurien supposes them to have been a sort of dii penates, or houshold gods.

THERIACA ANDROMACHI, a compound medicine, made in the form of an electuary, the ingredients of which, according to the college of London physicians, are as follows: Take of the troches of squills, half a pound; long pepper, opium strained, dried vipers, of each three ounces; cinnamon, balsam of Gilead, or in its stead expressed oil of nutmeg, of each two ounces; agaric, the root of florentine orrice, water germander, red roses, seeds of navew, extract of liquorice, of each an ounce and a half; spikenard, saffron, amomum, myrrh, costus, or in its stead zedoary, camel's hay, of each an ounce; the root of cinquefoil, rhubarb, ginger, indian leaf, or in its stead mace, leaves of dittany of Crete, of hore-hound, and of calamint, french lavender, black pepper, seeds of macedonian parsley, olibanum,

chio turpentine, root of wild valerian, of each six drams; gentian root, celtic-nard, spignel, leaves of poley-mountain, of St. John's wort, of ground pine, tops of creeping germander, with the seed, the fruit of the balsam-tree, or in its stead cubebs, aniseed, the lesser cardamom seeds husked, seeds of bishop's weed, of hartwort, of treacle mustard, or mithridate mustard, juice of the rape of cistus, acacia, or in its stead japan earth, gum arabic, storax strained, sagapenum strained, lemnian earth, or in its stead bole armenic or french bole, green vitriol calcined, of each half an ounce; root of creeping birthwort, or in its stead of the long birthwort, tops of the lesser centaury, seeds of the carrot of Crete, opopanax, galbanum strained, russia castor, jew's pitch, or in its stead, white amber prepared, root of the sweet flag, of each two drams; of clarified honey, thrice the weight of all the rest. The ingredients are to be mixed in the same manner as in the mithridate.

The college of Edinburgh have given the following reformation of this composition, under the title of Theriaca Edinensis.

Take of Virginian snake root, six ounces; wild valerian root, contrayerva root, each four ounces; aromatic powder, three ounces; resin of guaiacum, russia castor, myrrh, each two ounces; english saffron, opium, each one ounce; clarified honey, thrice the weight of the powders; canary wine, as much as is sufficient to dissolve the opium. This composition consists of very powerful ingredients, and is doubtless capable of answering every thing that can be reasonably expected from the more voluminous theriaca of Andromachus.

The theriaca andromachi is a reform of mithridate, made by Andromachus, physician to Nero; for the virtues whereof, see the article MITHRIDATE.

THERMÆ, artificial hot baths, much used by the Romans. See BATH.

THERMOMETER, an instrument for measuring the increase and decrease of the heat and cold of the air, by means of the elastic and expansive power of bodies of the fluid sort. See the articles AIR, HEAT, COLD, *&c.*

Many different ways, methods, and forms of constructing such an useful instrument have been thought of, and invented at several times for this purpose; at first air, then oil, then spirits of wine, and lastly, quicksilver, have been every way attempted and tortured in this experiment.

The spring of air, being sooner affected by heat and cold than that of any other fluid, was first thought upon as the best expedient to answer this end; and so it really would be, were it not that the weight or pressure of the atmosphere affects it also at the same time; and by acting sometimes with, sometimes against it, renders the effect by heat or cold very uncertain, and, therefore, the instrument useless. For example: the air in the bottle A F (plate CCLXXV. fig. 2. nº 1.) will, by its expansion, when the air grows warmer, raise the water higher in the tube than the point H; and if the air be lighter at this time, it will press less on the surface of the water at H, and so will suffer it to rise still higher. But if the air be heavier, it will act against the spring, and not permit it to raise the water so high. The same may be observed with respect to its contraction by cold; wherefore such an instrument, for common or constant use, will not do at all, though, perhaps, none is better calculated for some extemporaneous uses, as measuring the degree of coldness in different cellars, or of warmth in divers rooms upon the same floor.

It was upon this account found necessary to have recourse to some other fluid, which, secured from the pressure of the air in a tube, hermetically sealed, might expand and contract solely by the heat and coldness of the air about it. And, because most fluids are subject to freeze or thicken in great degrees of cold, it was soon considered that spirits of wine, a little tinged with cochineal, would best answer the purpose, and accordingly thermometers were generally made therewith, and became of common use.

Though the spirit of wine thermometers would do very well to shew the comparative heat of the air, yet this was far short of the virtuoso's views, who wanted to explore the various and vastly different degrees of heat in other bodies, as boiling water, boiling oils, melted metals, and even fire itself, and degrees of cold too, beyond what the spirit thermometer can shew. For spirit in a moderate degree of heat will burst the tube; and in an intense degree of cold will freeze, as the french philosophers found, who went to measure a degree upon the surface of the

the earth under the north polar circle. It having been found by experiment, that linſeed oil required four times the degree of heat to make it boil as water did, it was quickly ſubſtituted inſtead of ſpirits for philoſophic uſes. This Sir Iſaac Newton always uſed, and by it diſcovered the comparative degree of heat which makes water boil, which melts wax, which makes ſpirit of wine boil, and melts tin and lead; beyond which we do not find the oil thermometer has been applied: for which reaſon (as alſo for its ſullying the tube) it has been leſs uſed of late.

The mercurial thermometer, which will ſuſtain any degree of heat or cold, as far as any inſtrument of this kind can be expected to do, as invented by Mr. Farenheit, of Amſterdam; and though ſeveral artificers made them as well as he, yet they ſtill go by his name. Dr. Boerhaave uſed only this thermometer. As the mercury very freely and uniformly expands itſelf from hard froſt to the heat of ſummer, ſo one ſort of thoſe thermometers are contrived with a ſcale, to include thoſe extremes only, and the beginning of the diviſions, or o, is fixed to that altitude of the quickſilver, as is obſerved when water juſt begins to freeze, or ſnow to thaw; for which reaſon that is called the freezing point in the ſcale. This thermometer is ſmall, ſhort, put in a neat frame, and carried in the pocket any where.

But the grand thermometer of Farenheit is graduated after a different manner, as deſtined to a more critical and extenſive uſe. In this the bulb, or large part at the bottom, is not ſpherical, as in common ones; but cylindrical; to the end, that the heat may penetrate and reach the inmoſt parts as ſoon as poſſible, ſo that the whole may expand uniformly together. Hence it is, that in the cylindric bulb the fluid will expand and riſe immediately, whereas in the ſpherical bulb it is ſeen firſt to fall (by the ſudden expanſion of the ball, before the fluid is heated) and then to riſe, by the expanſion of the fluid when heated. We have given a figure, both of Farenheit's mercurial thermometer, and alſo of Sir Iſaac Newton's made with linſeed oil. See plate CCLXXV. fig. 2. n° 2.

Sir Iſaac's ſeems to be the beſt fitted of any for a ſtandard weather thermometer; and even for any degree of heat which the various ſtates of the human body exhibit; and alſo for thoſe different degrees which vegetation requires in the green-houſe, hot-bed, &c. In all which caſes it is neceſſary there ſhould be one common, unerring, and univerſal meaſure, or ſtandard, which at all times, and at every place, will ſhew the ſame degree of heat, by the ſame expanſion of the fluid, according to which the ſcale ſhould be made in every ſtandard thermometer. In order to this, the tube propoſed ſhould be very nicely weighed, when empty, and then the bulb, and about a tenth part of the length of the tube above it, is to be filled with quickſilver; then it is to be weighed again, and the exceſs of this, above the former weight, will give the weight of the quickſilver poured in; this will give the weight of the 100th part. Let a mark be made with a file upon the tube at the ſurface of the incloſed quickſilver.

Then weigh out nine or ten parcels of quickſilver, each equal to a hundredth part of that firſt put in the tube, and having poured the ſeveral parcels in one after another upon the incloſed quickſilver, and marked the tube ſucceſſively at the ſurface of each parcel, you will have the tube divided into proper intervals, which, if the bore of the tube be everywhere the ſame, will be equal to each other; if not, they will be unequal; and each of theſe intervals is to be divided into ten others, increaſing or decreaſing as the intervals do.

When this is done, the capacity of the tube is divided into thouſandth parts of that of the ball, and the contiguous part of the tube reaching up to the firſt mark. The tube is now to be put into a frame, and by the ſide of it is to be placed a ſcale, divided into thouſandth parts, exactly correſponding to thoſe on the tube; and writing 1000 over againſt the firſt mark, you write 1010 over-againſt the ſecond, 1020 againſt the third, and ſo on, as you ſee in the figure.

The ſtandard thermometer-tube, and its ſcale, being thus conſtructed, is then to be filled with ſome proper fluid, as linſeed-oil, where great degrees of heat are not propoſed; and mercury is to be uſed, when they are. When the fluid is poured in, it is to be adjuſted in ſuch a quantity, that it may ſtand juſt at the principal point, marked 1000, in water juſt freezing. And here great precaution is to be uſed; for many trials muſt de-

termine this point to which the fluid muſt always riſe by ſlow degrees, and with an uniform motion.

When this point is well ſecured, all the trouble is over, the ball, being then immerſed in boiling water, ſpirits, oils, melted metals, &c. in ſnow, freezing mixtures, &c. the expanſions, by all the various degrees of heat and cold, will be ſhewn by the number againſt the heights to which the fluid riſes in the tube, in each caſe, theſe are to be wrote on the ſide of the ſcale; and, ſince the ſame degree of heat will cauſe the ſame expanſion of the ſame fluid at all times, it is evident, if thermometers were every-where conſtructed in this manner, the obſervations made by them in any part of the world, may be compared together, which cannot otherwiſe be done; whence this part of philoſophy would receive its final perfection.

By one of thoſe ſtandard thermometers well made, many more might ſoon be conſtructed with any expanding fluid, without the trouble of graduating their tubes by equal quantities of quickſilver. For having filled the balls, and a convenient part of the tube, with the propoſed fluid, place them all together in a veſſel of cold water; and while it is warming as gently as poſſible, when the oil in the ſtandard thermometer ſhall arrive ſucceſſively at the ſeveral diviſions of its ſcale, at the ſame inſtant of time mark the new tubes at the ſeveral heights of their fluids, and form a ſcale for every tube, that ſhall correſpond to thoſe marks. Then, while the liquors ſubſide by cooling gently, examine whether they nicely agree at the ſeveral marks. To determine the freezing point in all, they are to ſtand together in the water till it juſt begins to freeze: or, having all the other points duly, that may be deduced very exactly by the rule of proportion.

A thermometer that ſhall vary very ſenſibly by every ſmall variation of heat and cold, as thoſe of the atmoſphere, muſt have a large ball in proportion to the bore of the tube; and, that the heat or cold may ſooner penetrate the innermoſt parts of the liquor, the ball ſhould not be ſpherical, but oblong and flatted like a french flaſk; and the lengths of the tubes ſhould be proportioned to the degrees of heat they are intended to diſcover.

Sir Iſaac Newton graduated his ſtandard thermometer on both ſides, as ſhewn in the figure. Thoſe on the right hand meaſured the heat of the oil; as thoſe on the left meaſured the bulk thereof: but ſince the latter, as well as the former, begins from a cypher at the freezing point, and is regularly continued upwards by the common diviſions 10, 20, 30, 40, &c. it will equally ſerve both purpoſes; ſince the degree of heat will always be proportioned to the expanſion of the bulk of the fluid above or below the freezing point.

By this diviſion therefore on the left hand, we ſhall expreſs ſome of the principal articles of Sir Iſaac Newton's ſcale of the various degrees of heat, as in the table below.

| D. of heat. | |
|---|---|
| 0 | Water juſt freezing, and ſnow juſt thawing. |
| 1 to 4 | The heats of the air in winter. |
| 4 to 8 | The heats of the air in ſpring and autumn. |
| 8 to 12 | The heats of the air in ſummer. |
| 13 | The greateſt ſummer-heat. |
| 26 | The greateſt heat of the external parts of the human body. |
| 31 | Water juſt tolerable to the hand at reſt. |
| 36½ | Water hardly tolerable to the hand in motion. |
| 43 | Melted wax juſt growing ſtiff and opake. |
| 51½ | Melted wax juſt before it bubbles or boils. |
| 54 | Spirit of wine juſt begins to boil. |
| 72 | Water begins to boil. |
| 75 | Water boils vehemently. |
| 86 | A mixture of $\frac{1}{10}$ of lead, $\frac{2}{5}$ of tin, and $\frac{1}{2}$ biſmuth, melts. |
| 103 | A mixture of equal parts of tin and biſmuth melts. |
| 122 | A mixture of $\frac{3}{5}$ of tin and $\frac{2}{5}$ of lead melts. |
| 154 | The heat which melts tin. |
| 174 | The heat which melts biſmuth. |
| 206 | The leaſt heat which melts lead. |
| 290 | The heat with which burning bodies ſhine in a dark place. |
| 410 | The heat of a ſmall coal-fire. |
| 450 | The heat of a ſmall wood-fire. |

Dr. Hales conſiders the freezing point as one

Vista comparativa de los mas notables termometros

# A Comparitive View of the most remarkable THERMOMETERS

No 3

No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

J. Jefferys sculp

one boundary to vegetation, *viz.* on the fide of cold; and the other boundary he fixes to that degree of heat with which wax will begin to melt, becaufe a greater degree of heat will, inftead of collecting and affimilating the nutritive particles, diffipate them, even thofe which are moft vifcid and glutinous; and therefore the plant will rather fade than vegetate in fuch degrees of heat.

This fpace the doctor divided into one hundred equal parts in his thermometers: but his numbers, expreffed in thofe of the ftandard-thermometer, are for feveral particulars mentioned by the doctor as follows. For myrtle, $4\frac{1}{2}$; oranges, $6\frac{1}{2}$; ficoides, $7\frac{1}{2}$; indian fig, $8\frac{1}{4}$; aloe, 10; cereus, 11; euphorbium, 12; piamento, 13; ananas, $14\frac{1}{2}$; melon-thiftle, $15\frac{1}{4}$; air under the glafs of a hot-bed, 17; the hot-bed itfelf, 28. If the hot-bed exceed the heat of 40, or thereabouts, it will fcorch the plants and kill them. The heat of milk from the cow is 28, that of urine 29, and of blood in a fever nearly 40.

As Farenheit's thermometer is come into fuch general ufe, we have here placed it by the ftandard thermometer, that the divifions on each may be reduced to the other's refpectively by bare infpection, and the ufe of both be ftill preferved.

But that the reader may be enabled to form fome idea of the feveral forts of thermometers, and the different methods of graduating them, we have given a comparative view of the moft remarkable ones in plate CCLXXVI. where n° 1. reprefents Farenheit's thermometer; n° 2. that of the Royal-fociety; n° 3. Sir Ifaac Newton's; n° 4. Dr. Hales's; n° 5. that of Edinburgh; n° 6. Fowler's; n° 7. and 8. thofe of Florence; n° 9. that of Paris; n° 10. De la Hire's; n° 11. Amonton's; n° 12. Poleni's; n° 13. Reaumur's; n° 14. De l'Ifle's; n° 15. Crucquis's, and n° 16. Th. de Lyon's. The reader may alfo confult Dr. George Martin's treatife on this fubject, where he will find it explained to his fatisfaction.

THERMOSCOPE, an inftrument fhewing the changes happening in the air with refpect to heat and cold.

The word thermofcope is generally ufed indifferently with that of thermometer, tho' there is fome difference in the literal import of the two; the firft fignifying an inftrument that fhews, or exhibits, the changes of heat, &c. to the eye; and the latter an inftrument that meafures thofe changes; on which foundation the thermometer fhould be a more accurate thermofcope, &c. This difference the excellent Wolfius taking hold of, defcribes all the thermometers in ufe as thermofcopes; fhewing that none of them properly meafures the heat, &c. none of them do more than indicate the fame. Though their different heights, yefterday and to-day, fhew a difference of heat, yet, fince they do not difcover the ratio of yefterday's heat to to-day's, they are not ftrictly thermometers.

THESEA, in antiquity, feafts celebrated, by the Athenians, in honour of Thefeus, confifting of fports and games, with mirth and banquets: fuch as were poor and unable to contribute to them were entertained at the public expence.

THESIS, a general pofition which a perfon advances, and offers to maintain. In colleges it is frequent to have placards, containing a number of them, in theology, in medicine, in philofophy, in law, &c.

THESIUM, in botany, a genus of the pentandria-monogynia clafs of plants, having no corolla but the calyx, which being coloured on the infide has paft for a corolla with fome: there is no pericarpium: the calyx holds in its bottom a fingle roundifh feed.

THESSALY, now called Janna, a province of european Turkey, bounded by Macedonia, on the north; by the Archipelago, on the eaft; by Achaia, or Livadia, on the fouth; and by Epirus, on the weft.

THETFORD, the county-town of Norfolk, fituated twenty-five miles fouth-weft of Norwich.

It fends two members to parliament.

THEVETIA, in botany, a genus of the pentandria monogynia clafs of plants, the corolla whereof confifts of an infundibuliform petal: the tube is oblong: the limb large, and divided into five fegments: the fruit is an orbiculated, unilocular, depreffed drupe, acuminated on the central part: the feed is an ovato-trigonal nut.

THEURGY, a name given to that part of magic called white magic, or the white art. Thofe who have written of magic have divided it into three kinds; the firft is theurgy, as operating by divine means: the fecond, natural magic; performed by the powers of nature: and the third, necromancy; which they imagined proceeded from

from invoking dæmons. See MAGIC.

THIBET, or TIBET, one of the most powerful of the Tartar kingdoms, having China on the east, and India on the west.

THIGH, *femur*, in anatomy, that part of the body of men, quadrupeds, and birds, between the leg and the trunk. See the article FEMUR.

*Fractures and Luxations of the* THIGH. The thigh-bone, though the largest and stoutest in the whole body, is yet frequently broken, both near its middle and towards its ends or articulation, but more particularly near that part called its neck, near its articulation with the hip-bone; and when this is the case it is very difficult to set it, and retain it in its place. When the bone is broken in two places at once, which sometimes happens, the danger is much greater. Sometimes this bone is broken transversely, sometimes obliquely, and at other times the ends slip in a great way over one another, notwithstanding the utmost caution in setting it. It is therefore necessary in these cases, according to Heister, besides the means that are common to all the fractures, to use a more strict and tight bandage in this than in the transverse fracture, to prevent the bones from being easily removed. When a fracture of the thigh-bone happens near the middle, or towards its lower head, it is to be extended and replaced with the hands like other fractures, except that the extending force required is very great: and where the hands of a strong assistant are not enough, slings, napkins, or linen-bandages are to be bound round each head of the thigh, whereby the fractured bone may be extended both ways by the strength of three or four persons at once, while the surgeon cautiously reduces the fracture with his hands, and secures it with a proper bandage and dressing: and there are sometimes cases where the joint strength of three or four men applied in this manner, is not sufficient to make the necessary extension; in which case the surgeon is obliged to have recourse to ropes and pullies, by means of which one man will pull more forcibly and equally than several can without them: but cases that require this treatment are not common. See the articles FRACTURE and EXTENSION *of fractured limbs*.

When the neck of the thigh-bone is fractured, to which, from its oblique or transverse direction, and spongy or brittle substance, it is very subject, it makes a fracture not only difficult to reduce, but such a one as can seldom be cured without leaving the limb shorter than it was before. The reasons of which are, that the fragments cannot, but with great difficulty, be pressed into their right places, by reason of the great thickness and strength of the muscles which cover them; and, that it seldom happens that the bones can be retained in their natural position, after they have been ever so well reduced; because the muscles which pass over, and are inserted below, the neck of this bone, draw its lower part upwards: to which it may be added, that it is very difficult to discover when the neck of the thigh-bone is fractured; this case being usually taken for the head of the bone being slipped out of its socket. If the fracture of the bone be accompanied with a wound, it makes the case very difficult and dangerous; and if these accidents happen to be inflicted on the neighbouring joint, death is generally the consequence, more especially when any of the large vessels are wounded. See WOUND and HÆMORRHAGE.

The thigh-bone, Heister observes, is found to be capable of luxation four ways, upwards and downwards, and backwards and forwards; but it is most frequently dislocated downward and inward, towards the large foramen in the os pubis. For besides that the cartilaginous defence on the lower part of the acetabulum is not so high as on the rest, the ligamentum rotundum is ever found to give way more readily in that part than in any other; and, lastly, the adjacent muscles are found to be weakest on this part. And there is besides, a certain eminence in this edge of the acetabulum which prevents the head of the bone from falling back again easily into its right place when once it is got this way out of it. But if the head of this bone be displaced outwards, it generally slips upwards at the same time, it being scarce possible but that the very strong muscles of the thigh must then draw the bone upwards; and there is no eminence in this edge of the acetabulum to resist the head of the bone in that passage. See LUXATION.

When the thigh is dislocated forwards and downwards, which is what most usually is the case, the leg hangs strad-

ling outward, and is longer than the other; the knee and foot alſo both turn outwards, and the head of the bone itſelf will be felt near the lower part of the inguen and os pubis. Sometimes there is a ſuppreſſion of urine in this caſe, which is occaſioned by ſome nerve which communicates with the bladder being violently compreſſed; in the buttock there alſo may be perceived a cavity from the trochanter major, and the reſt of the bones being diſplaced; and if the thigh-bone be not timely reduced into its acetabulum, the whole limb withers ſoon afterwards. The patient, for this reaſon, can bear little or no ſtreſs upon that limb, but muſt always incline and throw the weight of his body upon the other: when he moves forward, he muſt move that limb in form of a ſemicircle, and ſupport his body by crutches under the arms: though there are not wanting particular caſes where the head of the luxated thigh-bone has grown ſo firmly to the adjacent part, without the acetabulum, as to become, in proceſs of time, ſo ſtrong as to ſupport the body without ſticks, though the perſon could not, in any of the caſes that have been known of this kind, walk without halting.

If the thigh-bone be diſplaced backward, it is uſually drawn upward alſo, as before obſerved, at the ſame time; hence there will be perceived, in this caſe, a cavity behind the inguen, and a tumour upon the buttock, becauſe the head, and trochanter of this bone, will be placed there. The tumour on the buttock being thruſt upward, the limb will become ſhorter than before, and the foot will be inclined to turn inwards. The heel will not touch the ground, but the perſon ſeem to ſtand upon his toes; and laſtly, the luxated limb will be much more eaſily bent than extended.

It is extremely rare that the thigh is luxated forward or backward, without being alſo drawn upward or downward; but if it ſhould ſo happen, it will yet evidently be diſcovered by the rules before given, and by conſidering the nature of the articulation of the bone: as it is, however, at beſt very difficult to diſcover when the thigh-bone is diſlocated, and when it is fractured, either by feeling or inſpecting, becauſe of the great thickneſs of the muſcles and integuments: it is therefore a matter of ſome conſequence to propoſe the ſigns by which one of theſe caſes may be known from the other. There is reaſon to judge the thigh-bone to be luxated when we find the ligaments of the bone have been relaxed by ſome preceding congeſtion of humours, when no external violence has been exerted upon it, when neither violent pain, tumours, nor inflammation follow; and laſtly, when the whole limb may be bent, and turned about at the acetabulum, without the ſurgeon's diſcovering any grating or cruſhing of the bones; and the contrary of theſe ſigns, which are what uſually take place, in what have been uſed to be called luxations of this bone, are very ſtrong indications of a fracture.

When the bone is found to be really diſlocated, it is to be reduced in a method agreeable to the nature and direction of the diſlocation. When it is diſplaced forward and downward, the patient is to be laid flat upon his back on a table; then a linen napkin, or ſtrong ſling, is to be made faſt about the groin, over the part affected, ſo that one end of the ſling may come over the belly, and the other over the nates and back, to be both tied together in a knot upon the ſpine of the os ileum, and afterwards either faſtened to a hook fixed in ſome poſt, or held firm by ſome aſſiſtance: in like manner, at the bottom of the thigh, a little above the knee, there muſt be faſtened another napkin or ſling, or elſe the girt of Hildanus, with a compreſs between it and the thigh; both theſe ſlings being drawn tight, the thigh is to be extended, but that not vehemently, but only ſo much as is ſufficient to draw the bone out of its ſinus, that it may be replaced into its proper acetabulum by the ſurgeon's hands; to this purpoſe the ſurgeon is, with one hand, to preſs the head of the thigh-bone outward, while the other conducts the knee inward. Or the reduction may be made by napkins faſtened about the thigh near its extremities, in the manner of ſlings, and the limb extended that way, the knee being at the ſame time preſſed inward by the hands.

If theſe methods are not ſufficient, it will be neceſſary to have recourſe to the polyſpaſton, or pulley, well known to the ſurgeons on theſe occaſions. This is to be the method of reduction of the thigh-bone when it is diſlocated forward; but when it is found to be luxated backward, the patient is to be placed flat on a table, with his face downward; the thigh is

then to be extended more ſtrongly than in the former caſe, and the reduction is to be performed by the ſurgeon's hand, an aſſiſtant all the while turning the limb ſomewhat inwards; and by this method the head of the thigh bone generally ſlips very readily from this ſort of diſlocation into its proper place. The limb is then to be ſecured with proper bandages, and the patient to be kept to his bed for three or four weeks.

THIMBLE, an inſtrument made of braſs, ſilver, iron, &c. put on the finger to thruſt a needle through any cloth, ſilk, &c. uſed by all ſeamſtreſſes, taylors, &c. The common thimbles are generally made of ſhruff and old hammered braſs. This they melt, and caſt in a ſort of ſand, with which and red ochre are made moulds and cores. They are caſt in double rows, and when cold taken out, and cut off with greaſy ſhears. Then the cores being taken out, they are put into a barrel, as they do ſhot, and turned round with a horſe till they rub the ſand one from another: from thence they are carried to the mill to be turned firſt on the inſide and afterwards on the outſide: then ſome ſaw-duſt, or filings of horn combs, are put half way into each thimble, and upon it an iron-punch; and then with one blow againſt a ſtudded ſteed the hollow of the bottom is made: after this, with an engine, the ſides have the hollow made: this done, they are again poliſhed on the inſide: then the rim is turned at one ſtroke: and laſtly, they are turned in a barrel with ſaw-duſt, or bran, to ſcour them very bright. Iron thimbles, the thouſand, pay, on importation, 11 s. $6\frac{60}{100}$d. and draw back, on exportation, 4 s. $8\frac{25}{100}$d. Braſs thimbles, the thouſand, pay, on importation, 14s. $4\frac{35}{100}$d. and draw back, on exportation, 12 s. $11\frac{25}{100}$d.

THINKING, a general name for any act or operation of the mind. See MIND.

Chauvinus, with the carteſians, will have thinking to conſiſt in a certain native inherent motion or agitation of the human mind, whereof itſelf is conſcious; for they conceive it to be no other than the very eſſence of the mind itſelf, or at leaſt its principal and eſſential property. All the materials of thinking are by Mr. Locke derived from the two ſources of ſenſation and reflection. See the articles SENSATION and REFLECTION.

The ſchool philoſophers uſually divide thinking into intellectual and volitive. Intellectual is ſubdivided into perception, judgment, reaſoning, and method. Volitive thinking, or volition, admits of infinite different modifications, or new determinations. See the articles PERCEPTION, JUDGMENT, &c.

The doctrine of the carteſians, who maintain that thinking is eſſential to the human ſoul, and that there is no time when the ſoul does not think, is overturned by Mr. Locke, who ſhews, that in ſleep, without dreaming, there is an entire ceſſation of all the modes of thinking. See the article IDEA.

THIRD, *tertius*. See the articles NUMBER and NUMERATION.

THIRD, in muſic, a concord reſulting from a mixture of two ſounds, containing an interval of two degrees.

It is called third, as containing three terms or ſounds, between the extremes. The third, in Italian *terza*, in French *tierce*, in Latin *tertia*, has no general name in the Greek: it is the firſt of the imperfect concords, *i. e.* of ſuch as admit of majority and minority, without ceaſing to be concords. And hence it is diſtinguiſhed into two kinds. The firſt, which the Italians call *ditono*, from the Greek *ditonos*, or *terza maggiore*, and the greater third, is compoſed diatonically of three terms or ſounds, containing two degrees or intervals, one whereof, in the antient ſyſtem, is a greater tone, and the other, a leſſer tone; but, in the modern temperate ſyſtem, they are both equal, as *ut, re, mi*; or *ut, mi*. See the articles INTERVAL and CONCORD.

Chromatically it is compoſed of four ſemitones, two whereof are greater, and the third leſs; it takes its form from the ratio ſeſquiquarta, 4 : 5.

The ſecond third, which the Italians call trihemituono, or ſemi-ditono, or terza minore, and we leſſer third, is compoſed, like the former, of three ſounds or terms, and two degrees or intervals; but theſe degrees, diatonically, are only a greater tone and ſemi-tone.

Chromatically it is compoſed of three tones, two greater and one leſs; as *re, mi, fa*; or, *re, fa*.

It takes its form from the ratio ſeſquiquinta, 5 : 6.

Both theſe thirds are of admirable uſe in melody, and make, as it were, the foundation and life of harmony.

THIRD POINT, or TIERCE POINT, in architecture, the point of ſection in the vertex of an equilateral triangle.

Arches or vaults of the third point, called by the Italians di terzo acuto, are thoſe conſiſting of two arches of a circle meeting in an angle a-top.

THIRDINGS, in the manor of Turfat, in the county of Hereford, is the third part of the corn or grain on the ground, due to the lord for a heriot, on the death of his tenant. See the article HERIOT.

THIRSK, a borough-town in the north-riding of Yorkſhire, ſituated on the river Swale, ſixteen miles north-weſt of York. It ſends two members to parliament.

THIRST, *ſitis*, an uneaſy ſenſation, ariſing from a deficiency in the ſaliva to moiſten the inward parts of the mouth; hence ariſe a ſtrong deſire for drink: it is a ſymptom generally attending feveriſh diſorders.

THISTLE, *carduus*, in botany. See the article CARDUUS.

*Order of the* THISTLE, or *of St.* ANDREW, a military order of knighthood in Scotland, the riſe and inſtitution whereof is variouſly related by different authors: Leſley, biſhop of Roſs, reports, that the night before the battle between Athelſtan king of Northumberland, and Hungus king of the Picts, a bright croſs, in form of that whereon St. Andrew (the tutelar ſaint of Scotland) ſuffered martyrdom, appeared to Hungus, who having gained the victory, ever after bore the figure of that croſs on his banners. Others aſſert, that Achaius king of Scotland, firſt inſtituted this order, after having made the famous league offenſive and defenſive with Charlemagne king of France. But although the thiſtle had been acknowledged as the ſymbol of the kingdom of Scotland from the reign of Achaius, yet ſome refer the beginning of this order to the reign of Charles VII. of France. Others place the foundation of it as low as the year 1500.

The chief and principal enſign is a gold collar compoſed of thiſtles and ſprigs of rue interlinked with amulets of gold, having pendent thereunto the image of St. Andrew with his croſs, and the motto, NEMO ME IMPUNE LACESSET. See plate CCLXXIV. fig. 4. n° 1.

The ordinary or common enſign worn by the knights, is a ſtar of four ſilver points, (*ib.* n° 4.) and over them a green circle, bordered and lettered with gold, containing the ſaid motto, and in the center is a thiſtle proper; all which is embroidered on their left breaſt, and worn with the collar, with a green ribband over the left ſhoulder, and brought under the right arm; pendent thereto is the image of St. Andrew, with his croſs, in a purple robe, within an oval of gold enamelled vert, with the former motto: but ſometimes they wear, incircled in the ſame manner, a thiſtle crowned.

About the time of the reformation, this order was dropped, till James II. of England reſumed it, by creating eight knights: however, the revolution unſettled it again, and it lay neglected till queen Anne, in 1703, reſtored it to the primitive deſign, of twelve knights of St. Andrew. King George I. in the firſt of his reign, confirmed the ſtatutes ſigned by queen Anne, with the addition of ſeveral more, among which was that of adding rays of glory to ſurround the figure of St. Andrew, which hangs at the collar: and tho' from the reformation to George I. both elections and inſtallments had been diſpenſed with, his majeſty ordered that chapters of election ſhould, for the future, be held in the royal preſence; to which end he ordered the great wardrobe to provide the knights brethren, and officers, with ſuch mantles as the ſtatutes of the ſaid order appointed.

THLASPI, TREACLE-MUSTARD, in botany, a genus of the tetradynamia ſiliculoſa claſs of plants, the corolla whereof conſiſts of four petals, vertically ovated, and diſpoſed in the form of a croſs; the ſtamina are ſix filaments, about half the length of the cup; the fruit conſiſts of a bilocular pod or capſule, narrowed at the baſe, and emarginated, and containing numerous ſeeds, affixed to two ſutures. See plate CCLXXVII. fig. 1.

This genus comprehends the burſa paſtoris of authors.

The ſeeds of the thlaſpi agree in medicinal virtues with the common muſtard. See the article SINAPI.

THLIPSIS, θλιψις, a compreſſion of the ſtomach from food, which is offenſive only by its quantity, and not endued with any remarkable quality; or from a conflux of humours, void of acrimony, into the part.

THOMÆANS, THOMEANS, THOMISTS, or *Chriſtians of St.* THOMAS, a people of the Eaſt Indies, who, according to tradition, received the Goſpel from St. Thomas. Upon the arrival of the Portugueſe at Calicut, in their firſt voyage to the Indies, they met with antient chriſtians, who pretended to be deſcended from

from thofe converted by St. Thomas. The thomæans being informed of a new people arrived among them, who bore a particular veneration for the crofs, fent embaffadors to them, to make an alliance with them, and to follicit their affiftance againft the gentile princes, by whom they were greatly oppreffed. A mixture of opinions, with a total interruption of paftors, fometimes for feveral years together, occafioned that horrible chaos their religion was in, at the arrival of the Portuguefe; for a fpecimen whereof we fhall add their manner of celebrating the eucharift: over their altar was a kind of gallery; and while the prieft was faying the beginning of the office below, a cake of flour of rice was frying in oil, or butter, above; when enough, the cake was let down in a bafket upon the altar, where the prieft confecrated it: as to the other fpecies, for wine they ufed a kind of brandy or arrack, varioufly prepared in that country. Nor was their ordination much more regular; the archdeacon, who was fometimes more refpected than the bifhop himfelf, frequently ordained priefts: their other abufes were infinite. The Portuguefe, for thefe two laft centuries, have laboured the reformation of this church, and have employed both the ecclefiaftic and fecular power therein: for this end they have called the thomæan bifhops to the council at Goa, have inftructed, charged them, *&c.* and even fent them for inftruction to Portugal and Rome; but finding that they were ftill apt to relapfe at their return, and that no good was like to be done with them, they refolved to exclude them once for all, and to appoint an european bifhop in their room. Thefe proceedings have rendered the Portuguefe infinitely odious to the thomæans.

*St.* THOMAS, a city of the hither India, on the coaft of Coromandel, three miles fouth of Fort St. George; fubject to the Portuguefe.

*St.* THOMAS is alfo an ifland in the Atlantic ocean, fituated under the equator, in 8° eaft long.

*St.* THOMAS is alfo a town of Guiana, in South America, fituated on the river Oronoko; fubject to Spain.

*St.* THOMAS's DAY, a feftival of the chriftian church, obferved on Dec. 21. in commemoration of St. Thomas the apoftle.

*St.* THOMAS *of Canterbury's day*, a feftival of the romifh church, obferved on Dec. 29. in memory of Thomas Becket archbifhop of Canterbury, who was murdered, or, as the romanifts fay, martyred, in the reign of king Henry II.

*St.* THOMAS'S HOSPITAL. See the article HOSPITAL.

THOMISM, or THOMAISM, the doctrine of St. Thomas Aquinas, and his followers the thomifts, chiefly with regard to predeftination and grace. There is fome doubt what the true genuine thomifm is, but there are authors who diftinguifh the thomifm of St. Thomas from that of the dominicans. Others again make thomifm no other than a kind of janfenifm difguifed: but janfenifm, it is known, has been condemned by the popes, which pure thomifm never was: in effect, the writings of Alvarez and Lemos, who were appointed by their order to lay down and defend, before the holy fee, the dogmata of their fchool, have fince been reputed the rule of pure thomifm. The modern fchool has abandoned many of the antient thomifts, whofe fentiments and expreffions appeared to Alvarez too hard; and the new thomifts, who pafs the bounds marked by thefe two doctors, cannot give their opinions for the fentiments of the fchool of St. Thomas, which the pope has forbid being cenfured. Thofe two authors diftinguifh four claffes of thomifts: the firft, which they reject, deftroys or takes away liberty; the fecond and third do not differ from Molina; the laft, which Alvarez embraces, admits of a phyfical premotion or predeftination, which is a complement of the active power, whereby it paffes from the firft act into the fecond, that is, from complete and next power to action. The premotion they hold is offered in fufficient grace, fufficient grace is given to all men, and that they have a complete independent, next power not to act, and even to reject the moft efficacious grace.

THOMISTS, a fect of fchool-divines, who maintain thomifm. See the preceding article.

THORACIC, *thoracicus*, a name given to two branches of the axillary artery, on account of their conveying the blood into fome parts of the thorax. See THORAX. The thoracic arteries are diftinguifhed into upper and lower. There are likewife thoracic veins, upper and under, deftined for the conveyance of the blood from the thorax to the axillary vein.

THORACIC DUCT, or CHYLIFEROUS DUCT, a very flender canal, receiving the chyle from the chyliferous veffels, and the lymph

lymph from the lymphatics, and carrying them to the thorax, and usually through it to the subclavian vein. The beginning of this duct is in the reservoir or receptaculum chyli, which is situated in the left side of the upper vertebra of the loins, under the aorta, and the vessels of the left kidney; the rest of the duct has some resemblance of a sack or bag, and is larger and more irregular in its figure. Its end is usually in the subclavian vein; sometimes in the jugular. In dogs, and many other animals, its progress is under the aorta; but in the human body it ascends along the right side of the vertebra of the back, and passes between the aorta and the vena azygos, sometimes with a simple trunk, sometimes divided into two: its breadth, where divided, is about that of a wheat-straw. The best manner of demonstrating it in animals, is to feed a dog well, and then to strangle him; and as soon as the body is opened, to tie it up with a thread in the breast, just by the subclavian; by this means the cistern, or receptacle of the chyle, and the chyliferous vessels and lymphatics are all exposed evidently to view at once. In a human body they may also be observed any time after death, by injecting, according to Salzman, wax, or any fluid, or indeed only by inflating the great lymphatic vessel, which runs by the left emulgent vein; or otherwise, if, according to Henninger, an injection, or barely an inflation, be made into a lacteal of the second order, to be traced out in the middle of the mesentery; or, finally, if the pleura be carefully cut between the aorta and the vena azygos, the duct will usually be easily found there. It is composed of a fine, thin, and pellucid membrane, and within it there are valves, as in the lacteals and lymphatics, which prevent the reflux of the chyle. There are more of these in the human body than in beasts; and, finally, there is a semilunar valve, closing its extremity under the subclavian. The use of the thoracic duct is to carry the chyle to the blood, through the thorax, as it receives it from the receptacle, and with it the lymph from the lymphatics.

THORAX, in anatomy, that large part of the body situated between the abdomen and the neck. See the articles ABDOMEN and NECK.

The parts of the thorax are of two kinds, the continent or containing, and contained: the continent parts, or those which form the cavity, are either common, or proper; the common continent parts of the thorax are the cuticula, the cutis and the pinguello. See CUTICLE, &c.

The continent parts proper or peculiar to the thorax, are these; the breasts, the pectoral muscles, the intercostals, the diaphragm, the pleura; and, finally, the bones; of these last there are twenty-four ribs, the sternum, and twelve vertebræ. See the articles BREASTS, PECTORALIS, INTERCOSTALS, DIAPHRAGM, &c.

The contents of the cavity formed by these, or the parts contained in the thorax, are the mediastinum, the lungs, the heart and its pericardium, with the large vessels arising from it, particularly the trunks of the aorta, and the pulmonary artery of the vena cava and pulmonary vein, the thoracic duct, and, finally, the greater part of the oesophagus. See the articles MEDIASTINUM, LUNGS, HEART, PERICARDIUM, &c.

The uses of the parts of the thorax in general, are their serving to respiration and the circulation of the blood, in both sexes; and in women, to the producing milk. See the articles RESPIRATION, CIRCULATION, and MILK.

*Wounds of the* THORAX, are, by Heister, divided into three sorts. The wound is inflicted either upon the external parts of the thorax; or else it penetrates into the cavity of the thorax, without injuring any of its contents; or, lastly, the contents of the thorax also partake of the wound. That the wound terminates in the exterior parts, and does not penetrate into the cavity of the thorax, may be discovered by several methods, as by the sight, by hearing whether any sound proceeds from the wound at the time of inspiration, by feeling whether the finger or probe meets with any resistance in attempting to pass it into the cavity of the thorax; by injecting warm water, which, in this case, will return upon you; by the absence of bad symptoms, which always attend a wound that penetrates. When, by these methods, you are fully satisfied that it does not penetrate, it may be dressed with a digestive ointment, or some vulnerary balsam, and treated according to the method directed in the cure of slight wounds. See the article WOUND.

But when the wound penetrates into the thorax, and a large quantity of blood falls into the cavity thereof, then the office of respiration, and the course of the blood through the lungs, will certainly

be impeded; and the blood, by frequent delays and obstructions, being entirely inspissated in the lungs, life can no longer be supported: but where the quantity of extravasated blood is not large enough to obstruct the lungs in their office, the chief danger that the patient labours under, is that the extravasated blood should putrify by degrees, and corrupt the contents of the thorax, which will bring on very bad symptoms, and in a short time death. The following symptoms discover an extravasation of blood in the thorax: if there is a great difficulty of breathing except when the patient is placed in an erect posture; if the patient lies easiest upon his back, or wounded side; if he feels a weight upon the diaphragm; if he perceives the undulation of a fluid upon turning the body round; and, lastly, if there has been little or no discharge of blood by the wound. When it appears by these symptoms that there is a collection of blood in the thorax, the greatest diligence is required to get it out; therefore when the wound is inflicted upon the middle or lower part of the thorax, and has not a very narrow opening, it will be convenient to lay the patient upon the wounded side, advising him to fetch his breath as deep as he can, or to cough. If the current of blood is obstructed by any thick grumous parts, they must be removed with a probe or the finger, or drawn out with a syringe. If the blood is become too thick to flow out of the wound, attenuating injections must be used, made of a decoction of barley-water, with the addition of some common honey, or honey of roses, and a small quantity of soap; this is to be injected into the cavity of the thorax, and then the patient is to be so situated as to let it run out again: this operation is to be repeated, till it appears that all the grumous blood is washed away. But if the wound is so narrow or oblique, that this method cannot be prosecuted, the wound should be enlarged, being careful not to fatigue the patient too much, by endeavouring to discharge all the extravasated blood at one time, keeping the wound open, dressing it with proper plasters and compresses, securing the whole with a scapulary, and repeating this method of dressing, till the discharge shall entirely cease, and the external wound can be conveniently healed. When a wound is made in the upper part of the breast, no posture will satisfy the intention of discharging the extravasated blood, but standing upon the head; an opening ought therefore to be made in the lower part of the thorax, called paracentesis. See the article PARACENTESIS.

The cavity of the thorax being thus cleansed, the wound is to be dressed but once every day: each dressing should be performed with all possible expedition, and the utmost diligence should be used to guard the contents of the thorax from the external air. At the time of dressing, a chaffing-dish of hot coals should be held near the wound, to warm and thin the air; and if too great a quantity of air is already got into the cavity of the thorax, it must be drawn out with a syphon. When any of the contents of the thorax are wounded, as the heart, the aorta, the vena cava, the pulmonary artery or vein, the mediastinum, or a large portion of the lungs, death comes too suddenly to give the surgeon room to exercise his art. On the other hand, when the lungs are only slightly wounded, that is, when only the small ramifications of the pulmonary vein and aspera arteria are divided, the case is very dangerous, but not always mortal; though persons who recover after wounds of this kind, are more obliged to the soundness of their constitution, than their surgeon's skill.

THORN, a city of Poland, in the province of regal Prussia, situated on the river Vistula: east longitude 19°, and north latitude 52° 40′.

THORNBACK, in ichthyology, the prickly raia, with tuberculose teeth, and a transverse cartilage in the belly. See the article RAIA.

The head and body are very flat and depressed; the figure of the body, exclusive of the tail, is nearly square; the tail is long and slender, but a little depressed or flatted; the belly is altogether plane; the back in general is plane, but rises a little in the middle into a convexity; the eyes stand on the uppermost part of the body, at a considerable distance from the rostrum, and are a little protuberant, and covered with a simple and naked skin; behind each eye there is a single oblong foramen, that runs transversely, and its anterior side is striated, and serves as a valve to close up almost the whole aperture; the mouth is situated on the under side of the body, and lies in a transverse direction, is very large, and stands at the same distance from the extremity of the rostrum as the eyes do.

THORN-

THORNBURY, a market-town of Glocestershire, situated twenty miles south-west of Glocester.

THORNEY-ISLAND, an island made by the branches of the Thames formerly, where Westminster-abbey now stands.

THORNEY-ISLAND is also an island situated in a bay of the East channel, between Chichester and Portsmouth.

THOUGHT, or SENTIMENT, a general name for all the ideas consequent on the operations of the mind, and even for the operations themselves. See the articles IDEA and THINKING.

THOULON, or TOULON, a port-town of Provence, in France, situated on a bay of the Mediterranean sea: east long. 6°, and north lat. 43° 5′.

THOULOSE, or TOULOSE, a city of France, capital of the province of Languedoc, situated on the river Garonne: east long. 1° 5′, and north lat. 43° 40′.

THRACE, a province of european Turky, situated on the north side of the Propontis.

THRASHING, or THRESHING, *flagellatio*, in agriculture, the art of beating the corn out of the ears. See CORN.

There are two ways of separating corn from the ear; the first by beating it with a flail, which is properly what is called thrashing. The other method, still practised in several countries, is to make mules, or horses, trample on it, backwards and forwards; this is properly what the antients called tritura and trituratio. The Hebrews used oxen therein, and sometimes yoked four together for this purpose. Another way among the antients was with a kind of sledge, made of boards joined together, and loaden with stones or iron, upon which a man was mounted, and the whole drawn over the corn by horses: this instrument was called traha, or tribula. It is a rule among husbandmen, that the season for thrashing, is as soon as the corn has sweated in the heap or mow.

THRAVE, or THREAVE *of corn*, twenty-four sheaves, or four shocks of six sheaves to the shock; though, in some countries, they only reckon twelve shocks to the thrave.

THRAUSTOMITCHES, in natural history, the name of a genus of compound earths, the bodies of which are loams composed of sand and a less viscid clay, and are therefore of a friable or crumbly texture. See the article EARTH.

The earths of this genus are generally used to make bricks, and there are several species of them. 1. A whitish one, dug in great plenty in Staffordshire, and some other counties. 2. A brownish white one, very plentiful about London. 3. A pale yellow one, common in most parts of England, at small depths. 4. A sharp rough one, of a deep yellow, dug near the town of Hedgerly, near Windsor, and commonly called Windsor-loam; it is not found in any other place, and is of great value; it makes the bricks used for the iron-furnaces, and serves at the glass-houses; and among the chemists, as a very strong and valuable lute; and is not only used in England, but carried to Holland and Germany, and many other parts of the world. 5. A deep, dusky, yellow one, dug in most parts of England, near the surface. 6. A hard, brown one, found at some depth in Buckinghamshire, and usually found full of small shells; it is used for covering the ridges of barns, and copings of walls; and makes very firm and durable barn-floors. 7. A light, pale, brown one, the loosest and most friable of all the species, used in many places for making the bell-founders moulds. 8. A yellowish brown one: this is common in most parts of the kingdom, and makes the fine red bricks, used for ornamenting buildings.

THREE, *Rule of*. See the article RULE.

THRENODY, *threnodia*, a mournful or funeral song.

THRICHECHUS, the SEA-COW, in zoology, a genus of sea-animals, of the order of the plagiuri, the characters of which are, that it has teeth in both jaws; there is no fin upon the back, and the skin is very tough, firm, and hairy.

This creature seems to be the link uniting the fish and the quadruped-tribes, as the bat does the quadrupeds and birds: it grows to fifteen feet, or more, in length, and is considerably thick in proportion. The females have, between the pectoral fins, two large, round, and fair breasts, and both sexes have the parts of generation, and the navel perfectly resembling those of the human species: there is no doubt, but all the fables concerning mermaids, mermen, and syrens, took their rise from an imperfect view of this animal.

THRIPS, in the history of insects, a genus of the order of scleroptera, having the rostrum obscure, the body of a linear figure, and the wings four in number, being

being incumbent on the back, and ftrait. It is an extremely fmall infect, not equal to a flea in fize.

THROAT, the anterior part of an animal, between the head and the fhoulders, wherein is the gullet. See the article OESOPHAGUS.

For difeafes of the throat, fee the articles QUINSEY, TONSILS, &c.

THROAT, in architecture, fortification, &c. See the article GORGE.

THRONE, θρονος, a royal feat, or chair of ftate, enriched with ornaments of architecture and fculpture, made of fome precious matter, raifed on one or more fteps, and covered with a kind of canopy. Such are the thrones in the rooms of audience of kings, and other fovereigns.

THROWSTER, one who prepares raw filk for the weaver, by cleanfing and twifting it.

THRUPTOMICTHES, in natural hiftory, a genus of earths, confifting of moulds of a lax, friable texture. See the articles EARTH and MOULD.

Of this genus there are only two fpecies. 1. The red thruptomicthes, frequent in many countries: but no where more plentifully than about Rowel, in Northamptonfhire: it is accounted a very fertile good land, and, particularly, fucceeds with crops of rye, barley, or peafe. 2. The friable, brown thruptomicthes, frequent in Suffex, and in many other parts of the kingdom, and is generally accounted a poor, barren land.

THRUSH, in ornithology, two fpecies of turdus, the one called the common thrufh, and the other the miffel-thrufh. See the the article TURDUS.

The common thrufh is the turdus with a white line over the eyes. This is fmaller than the fieldfare; the head is fmall and flatted; the eyes are bright, their iris hazel; the ears patulous; the beak about half an inch long, brown and pointed; the head and back of an olive brown, fpotted with a dark colour; the breaft is yellow, the belly whitifh, and the legs brown.

The other fpecies of turdus, called the miffel-thrufh, is of a greyifh yellow colour with a fpotted breaft, being the largeft of the turdus kind.

THUIN, a town of the county of Namur, fituated on the river Sambre, near the confines of Hainault, nine miles fouthweft of Charleroy.

THULE, of the antients, fuppofed to be the iflands of Orcades.

THUMB, *pollex*, in anatomy, one of the parts or extremities of the hand. See the article HAND.

The thumb, confidered feparately, has bones thicker than thofe of the fingers; the firft of thefe agree in all refpects with thofe of the metacarpus, in figure, fituation, and articulation; but in its motion it is widely different. The articulation of the firft with the fecond, and of the fecond with the third, are like the articulations and motions of the fecond and third phalanges of the other fingers. See the articles FINGERS and PHALANX.

THUMMIM, in the fcripture-learning. See the articles URIM and THUMMIM.

THUNDER, a noife in the regions of the air, excited by a fudden kindling of fulphureous exhalations.

Thofe philofophers who maintain, that vapours are buoyed up in the air by particles of fire adhering to them, account for the phænomena of thunder and lightning in the following manner: they fuppofe that from the particles of fulphur, nitre, and other combuftible matter, which are exhaled from the earth, and carried into the higher regions of the atmofphere, together with the afcending vapours, is formed an inflammable fubftance, which, when a fufficient quantity of fiery particles is feparated from the vapours, by the collifion of two clouds, or otherwife, takes fire, and fhoots out into a train of light, greater or lefs, according to the ftrength and quantity of the materials. This opinion is certainly falfe; for it is impoffible the vapours fhould be attended with fuch fiery particles as is here fuppofed: neither have we occafion to fly to fuch an hypothefis; for as vapours, exhaled from the furface of the water, are carried up into the atmofphere, in like manner the effluvia of folid bodies are continually afcending thither. Now we find by experiment, that there are feveral inflammable bodies, which, being mixed together in due proportion, will kindle into flame by fermentation alone, without the help of any fiery particles. See the articles FERMENTATION, LIGHTNING, &c.

Thus, M. Lemery having covered up, in the earth, about fifty pounds of a mixture, compofed of equal parts of fulphur and filings of iron, tempered with water; after eight or nine hours time the earth,

earth, where it was laid, vomited up flames. Thus alſo, mix a ſmall quantity of gun-powder with oil of cloves, pour gently upon this mixture two or three times as much ſpirit of nitre, and you will obſerve a bright inflammation ſuddenly ariſing from it. A mixture of the two fluids alone will take fire, the powder is added only to augment the inflammation. When, therefore, there happens to be a mixture of the effluvia of ſuch bodies floating in the air, they ferment, kindle, and, flaſhing like gun-powder, occaſion thoſe exploſions and and ſtreams of fire, which we call thunder and lightning.

As to the particular ſpecies of the effluvia, which compoſe this mixture, that cannot be exactly determined: they are thought to be chiefly ſulphureous and nitrous; ſulphureous, becauſe of the ſulphureous ſmell which lightning generally leaves behind, and of that ſultry heat in the air, which is commonly the forerunner of it; nitrous, becauſe we do not know of any body liable to ſo ſudden and violent an exploſion as nitre is.

Dr. Liſter is of opinion, that the matter both of thunder and lightning, and alſo of earthquakes, is the effluvia of the pyrites; as he does, that the matter of vulcanos is the pyrites itſelf. This is a mineral that emits copious exhalations, and is exceeding apt to take fire upon the admiſſion of moiſture. See the doctor's defence of his notion in the Phil. Tranſ. n° 157. He thinks this may be the reaſon why England is ſo little troubled with earthquakes, and Italy, and almoſt all places round the Mediterranean ſea, ſo very much, *viz.* becauſe the pyrites are rarely found in England; and, where they are, they lie very thin, in compariſon of what they do in thoſe countries; as the vaſt quantity of ſulphur emitted from the burning mountains there, ſeems to ſhew.

The effects of thunder and lightning are owing to the ſudden and violent agitation the air is put into thereby, together with the force of the exploſion; and not to thunderbolts falling from the clouds, as is ſuppoſed by the vulgar.

Some are inclined to think, that thunderbolts are artificial, and that they were applied by the antients to ſome uſe. What confirms them in their opinion is, that they are found more frequently where ſepulchres have been, than in other places.

The diſtance the thunder is from us, may nearly be eſtimated by the interval of time between our ſeeing the lightning, and hearing the thunder; for as the motion of light is ſo very quick, that the time it takes up in coming to us from the cloud, is not perceptible; and as that of a ſound is about a thouſand feet in a ſecond; allowing a thouſand feet for every ſecond that paſſes between our ſeeing the one, and hearing the other, we have the diſtance of the cloud, pretty nearly, from whence the thunder comes. See the article LIGHT and SOUND.

THUNDERING LEGION, *legio fulminans*, was a legion in the roman army, conſiſting of chriſtian ſoldiers, who, in the expedition of the emperor Marcus Aurelius againſt the Sarmatæ, Quadi, and Marcomanni, ſaved the whole army then ready to periſh of thirſt, by procuring, with their prayers, a very plentiful ſhower thereon, and at the ſame time a furious hail, mixed with lightning and thunder-bolts, on the enemy. See the article LEGION.

This is the account commonly given by eccleſiaſtical hiſtorians, and the whole hiſtory is engraven in baſs-relievo's on the antonine column. And hence aroſe the denomination thunderers, tho' ſome ſay, that the legion, thoſe chriſtians were of, was called the thundering legion before.

THURINGIA LANGRAVATE, one of the diviſions of the circle of Upper Saxony, in Germany, having the dutchy of Magdeburg on the north, and Franconia on the ſouth.

THURSDAY, the fifth day of the chriſtian week, but the ſixth day of that of the Jews. See DAY and WEEK.

*Holy* THURSDAY, the ſame with aſcenſion-day. See the article ASCENSION.

*Maunday* - THURSDAY. See the article MAUNDAY-THURSDAY.

THURSO, a port-town of Cathneſs, in Scotland, ſituated on the Caledonian ocean, fifteen miles ſouth-weſt of Dungſby-head.

THUYA, *arbor vitæ*, in botany, a genus of the monoecia-monadelphia claſs of plants, having no corolla; the fruit is an ovato-oblong obtuſe cone, opening longitudinally, with oblong ſquamæ almoſt equal, obtuſe and convex on the outſide.

THYITES, in the materia medica, the ſame with the lapis morochthus. See the article LAPIS.

THYMUS, in botany, a genus of the didynamia-gymniofpermia clafs of plants, the corolla of which confifts of a fingle ringent petal; the tube is of the length of the cup; the faux is fmall; the upper lip is fhort, plane, erect, emarginated, and obtufe; the lower lip is long, patent, trifid, obtufe, and broader in the middle lacinia; there is no pericarpium; the feeds are four, fmall and roundifh, and are contained in the cup.

This genus, among other fpecies, comprehends the herb maftich, the common garden-thyme, the cretic thyme, the common wild thyme, &c.

The common thyme has an agreeable aromatic fmell, and a warm pungent tafte, which it imparts by infufion to rectified fpirit, and fends over, in diftillation with water; along with the water arifes an effential oil, extremely hot and pungent; this diftilled fpirit is an agreeable aromatic cordial liquor, not inferior to any thing of this kind.

THYMUS, in anatomy, a gland, which in infants is very remarkable: it is fituated in the upper part of the thorax, immediately under the fternum, and lies upon the pericardium, and on the trunk of the aorta, and of the vena cava. It extends itfelf from the pericardium, along the trunk of the aorta, to the beginning of the carotids, fometimes fo far as to the thyroide-gland; its figure is irregular and uncertain; its colour in infants is pale red, in adults it is of a dufkier hue; it is much larger in infants newly born, than in fubjects at any more advanced period. Its length is there no lefs than three fingers breadth, and its diameter two, its thicknefs is about half a finger: it gradually decreafes from this fize, as the child grows up; in adults it is very fmall, and in old people it entirely difappears. Its fubftance is glandulous and conglomerate, and it is furrounded by a membrane. It has blood-veffels fometimes from the fubclavians, fometimes from the mammary, and fometimes from the mediaftine ones; and in fome fubjects from the carotids and jugulars. Its lymphatics fometimes run to the thoracic duct, fometimes to the fubclavian veins; and they have in general no valves. The nerves of the thymus are from the par vagum, or from the intercoftals. There is fometimes a milky juice found in this gland, in new-born fubjects. It has no excretory duct hitherto difcovered, and its ufe is therefore not certainly known: poffibly, according to Heifter, it ferves to fecrete lymph, which it difcharges into the thoracic duct, for the dilution of the blood and of the chyle, as the glands of the mefentery, and of the pancreas do, in regard to the chyle. On this fuppofition its ufe is much greater in the fœtus, than at any time after the birth, becaufe the want of refpiration in that ftate may well be fuppofed to fubject the blood to be thicker, and to need more dilution than afterwards; nothing tending to attenuate blood fo much as refpiration. Bellinger is of opinion, that it prepares a nutritious fluid for the fœtus while in the uterus, and conveys it by particular ducts to its mouth: but it is to be obferved, that neither Bellinger himfelf, nor any body fince, have ever been able to find out thefe ducts. See the article FOETUS.

That our readers may be enabled to form a diftinct idea of this remarkable gland, we have given two views of it, as found in two fœtufes, juft born; fee plate CCLXXVII. fig. 2. n° 1. and 2. where A A is the heart, furrounded by its pericardium; B B, the gland thymus, divided in the upper part into two or three portions, *a a*; C C C, the three afcending branches of the aorta.

THYMUS, in medicine, is ufed for a kind of wart growing on the parts of generation, the fundament, and feveral other parts of the body. See the articles CONDYLOMA, WART, WEN, &c.

The ordinary method of curing a thymus, is by ligature and deficcative lotions, or by cauftics; and if large, by incifion, taking care firft to fecure the greater veffels, by tying them.

THYROARYTÆNOIDES, in anatomy, a mufcle of the larynx, which, arifing and terminating in it, ferves, together with the arytenoides, to conftringe it. Thefe two mufcles mutually interfect one another, and ftraiten the glottis; fometimes there is but one mufcle; and fometimes it is different from that defcribed here.

THYROIDE GLAND, in anatomy, is of a very fingular figure, refembling that of the new moon. It adheres by its middle part, which is called by authors its ifthmus, to the upper ring of the trachea, and its points or horns are turned upwards. It adheres on each part to the larynx and œfophagus.

THYROIDE CARTILAGE, one of the five cartilages that principally compofe the larynx.

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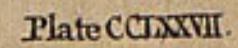



Fig. 2. THYMUS.

No 1

No 2

Fig. 1. THLASPI

Fig. 3. The TIGER.

Fig. 4. TILIA.

J. Jefferys sculp.

larynx. The thyroide is the firft of thefe cartilages, and is alfo called the fcutiform cartilage, being of a quadrangular figure, and ftanding in the anterior part, where the pomum Adami, as it is ufually called, makes its prominence, and the largeft of the other five cartilages.

THYROSTAPHYLINUS, in anatomy, the name of a mufcle of the uvula, which, arifing from the lateral part of the thyroide cartilage, and afcending towards the uva, becomes larger and is inferted in manner of an arch, in the fide of the velum palatinum.

THYRSUS, in antiquity, the fceptre which the poets put into the hand of Bacchus, and wherewith they furnifhed the menades in their bacchanalia. See the articles BACCHANALIA.

The thyrfus was originally a lance or fpear wrapped up in vine-leaves, wherewith Bacchus is faid to have armed himfelf and his foldiers in the indian wars, to amufe and deceive the unpractifed Indians, and make them expect no hoftilities.

Hence, it was afterwards borne in the feafts and facrifices of that god; and as the fatyrs, who were Bacchus's foldiers, were fuppofed to have fought with it, it became a cuftom to reprefent them therewith.

TIARA, an ornament or habit wherewith the antient Perfians covered their head, and which the Armenians, and kings of Pontus, ftill wear on medals; thefe laft, becaufe defcended from the Perfians.

TIARA is alfo the name of the pope's triple crown; antiently called regnum.

TIBER, a great river of Italy, which runs through the pope's territories, paffing by Perugia and Orvietto; and having vifited Rome, falls into the Tufcan fea at Oftia, fifteen miles below that city.

TIBIA, in anatomy, is the inner and bigger bone of the leg, called alfo focile majus: it is hard and firm, with a cavity in its middle; it is almoft triangular; its fore and fharp edge is called the fhin. In its upper extremity it has two large finufes, tipped with a foft and fubtle cartilage, called cartilago lunata, from its figure. It runs in between the extremities of the two bones, and becomes very thin at its edge, like thofe in the articulation of the lower jaw. It facilitates a fmall fide motion of the knee. The finufes receive the two protuberances of the thigh-bone, and the production which is between the finufes of the tibia, is received in the finus, which divides thefe two protuberances of the femur. By bending our knee, we bring our leg, in walking, in a ftraight line forwards, which, without this articulation, we could not have done: but, like thofe who have the misfortune to have a wooden leg, we muft have brought our foot about in a femicircle, in going even upon a plain, but more evidently upon a defcent. On the fide of this upper end it has a fmall knob, which is received into a fmall finus of the fibula; and, on its fore part, a little below the patella, it has another, into which the tendons of the extenfors of the leg are inferted. Its lower extremity, which is much fmaller than its upper, has a remarkable procefs which forms the inner ancle, and a pretty large finus divided in the middle of a fmall protuberance; the finus receives the convex head of the fame bone. It has another fhallow finus in the fide of its lower end, which receives the fibula.

The tibia has four extenfor mufcles, as the rectus, cruralis, vaftus, *&c.* and five flexors, *viz.* the gracilis, femi-membranofus, femi-nervofus, biceps, and poplitæus. See the article RECTUS, *&c.*

TIBIALIS, or TIBIÆUS, in anatomy, the name of two mufcles of the foot, diftinguifhed by the epithets anticus and pofticus. The tibialis anticus, one of the flexor mufcles, has its origin from the fuperior and extenfor furface of the tibia, and is terminated at the internal os cuneiforme, and the interior part of the internal metatarfal bone. The tibialis pofticus, or adductor mufcle of the foot, has its origin in the upper part of the interoffeous ligament, and its termination in the os naviculare. See the articles FOOT and MUSCLE.

TIBICEN, in ichthyology, the fame with the lyra or harp-fifh, a fpecies of trigla. See the articles LYRA and TRIGLA.

TIBISCUS, a river otherwife called Teifs. See the article TEISS.

TICK-TACK, a game with dice and tables, wherein all the men are placed on the ace-point.

The great art of this game confifts in fecuring the fice and cinque point; which ought never to be broken, unlefs for the advantage of going in, or a hit, which laft is, when you throw fuch a caft that fome of your men will reach your adverfary's unbound.

Playing clofe at home is the fafeft way; taking care to find your men, and giving your

your adverfary a fingle game, when in danger of lofing a double one.

TICKHILL, a market-town in the weft riding of Yorkfhire, thirty-three miles fouth of York.

TICKLING, fays M. le Cat, is, in refpect to the fenfe of feeling, what an hermaphrodite is in refpect to fexes: it partakes equally almoft of pleafure and pain; making one laugh, at the fame time that it is intolerable; and if carried too far, frequently has bad and even fatal effects. In this fenfation, the organs of feeling are affected with a light tremulous motion, which occafions all voluptuous fenfations; but more lively in its degree and fmarter, than that which ufually attends on pleafure: it proceeds from that gentle friction, which is diftinguifhed from all other impreffions on the organs, by the name of titillation.

TICKLISH, in the manege. A horfe is faid to be ticklifh, that is too tender upon the fpur, and too fenfible; that does not freely fly the fpurs, but in fome meafure refifts them, throwing himfelf up, when they come near and prick his fkin. A ticklifh horfe has fomewhat of the ramingues, *i. e.* the kickers againft the fpurs; but with this difference, that the latter put back, leap and kick, and yerk out behind, in difobeying the fpurs; whereas a ticklifh horfe only refifts for fome time, and afterwards obeys, and goes much better, through the fear of a vigorous ham, when he finds the horfeman ftretch his leg, than he does upon being actually pricked.

TIDDESWAL, a market-town of Darbyfhire, eighteen miles north-weft of Darby.

TIDES, two periodical motions of the waters of the fea, called the flux and reflux, or the flow and ebb.

The cafe of the tides is the attraction of the fun and moon, but chiefly of the latter; the waters of the immenfe ocean, forgetful, as it were, of their natural quietus, move and roll in tides, obfequious to the ftrong attractive power of the moon, and weaker influence of the fun. See the articles ATTRACTION and GRAVITATION.

To illuftrate this, let N E S Q (plate CCLXXVIII. fig. 1.) reprefent the earth, covered over with water A B D F; N S the axis of the earth, E Q the equator, T R the tropic of cancer, *t r* the tropic of capricorn, M the moon in her orbit, S the fun in his. Now fince all bodies are endued with an attracting virtue, the moon will attract all the water in the neareft hemifphere F A B, with degrees of force which are inverfely as the fquares of the diftances from all parts; and therefore with the ftrongeft force where the diftance is leaft, *viz.* in the point A, directly under her: and this attraction being in this hemifphere contrary to that of the earth, the water in all parts from B to F towards A will have its gravity decreafing, and be higheft of all at the part A; and confequently muft there ftand higher than at the point F, where being more attracted by the earth, it muft be heavier and nearer to the center, as is evident from the laws of hydroftatics. See the article FLUID.

Again, in the hemifphere F D B, the attraction of the moon confpires with that of the earth; but decreafing as the fquares of the diftances increafe, the joint force of attraction will every where decreafe from F and B towards D, the point oppofite to the moon; where, again, the waters will be lighteft, and therefore ftand higheft to preferve the equilibrium. Whence it appears, that by this fum and difference of the moon's and earth's attraction, there will neceffarily enfue a protuberance or fwelling of the waters, which we call tides of flood, in the two points A and D directly under the moon. Alfo in the two points F and B, as the waters are there moft attracted, fo they will be heavieft, and confequently rife to the leaft height from the earth's furface, whence they are called tides of ebb, or the ebbing of the water.

If to the power of the moon we add that of the fun, we fhall have the tides confiderably augmented at the conjunction in S, or oppofition in H, that is, at the new and full moons, which are called the fpring-tides; as thofe which happen when the fun is at O or P, are called neap-tides, the waters at A and D being then loweft, becaufe the attraction of the moon is then counterballanced by that of the fun.

It is farther to be obferved, that of the two tides of flood at A and D, that at A is greateft to any place T in northern latitude, when the moon is in the northern figns, and above the horizon: for the point A is then nearer the zenith of the place G, than the oppofite point D is to the fame place at R twelve hours afterwards; and, confequently, the height of the tide T G is greater than that of the oppofite tide Rg. The contrary of this

this happens, when the moon is in the southern signs.

That there are two tides of flood and two of ebb, succeeding each other alternately at about the interval of six hours, is obvious from the figure: and that they happen later each day near an hour, is owing to their exact correspondence to the motion of the moon, which daily culminates so much later. That they happen not when the moon is in the meridian, but about three hours after, is owing to the force of the moon being then greater than when in the meridian of any place; as the heat of the day is greater at three o'clock than at twelve; and the heat of the summer is greater in August, than at the 21st of June. Lastly, that the greatest spring-tides happen not at the 21st of March, and 23d of September, but in February and October, is because the sun being nearest the earth in December, his influence is then strongest, and so must quicken the time of the greatest vernal tides; and being weakest in June, the time of the autumnal tides will necessarily be retarded.

The sum of what has been said is this: if N O P Q (*ibid.* fig. 2.) be the surface of the earth, T its center, I F K G L H C E a circle representing the spherical surface of the waters covering the earth, and affected only by the attractive power of the earth: upon placing an attracting body at S, the waters will no longer continue their spherical figure, but be immediately drawn into the spheroidical figure A C B D, in such manner, as to be depressed at C and D to M and K, and elevated from L and I to A and B; and the elevation A L or B I, is double the depression C M or D K. That if S be the sun, then $AP - OK = AL + KD = 25$ inches; or $11\frac{1}{2}$ feet, if S be the moon. That at the points E, F, G, H, (which are called the octants) the water is neither elevated nor depressed. That if any other body be placed at O (as the moon) in the same right-line T S; then by the joint influence of both S and O, the elevation at A and B will be increased, and the depression at C and D likewise. Lastly, if S be in the situation *S*, or vertical to the point D, it is plain its action to raise the water D will be directly contrary to that of the moon in depressing it there; wherefore the depression will not be so great as before; for the same reason the elevation at A and B will be diminished, being now only as the difference of the two forces, whereas before they were as the sum.

We shall now consider the phænomena of the tides which remain; and first, it is evident, that if P N be the axis of the earth, and Q O the diameter of the equator, then the moon situated at O, over one of the poles, would accumulate the water over each pole, and the spheroid would be so posited as to have its longest axis A B coinciding with the axis of the earth P N. In this position of the spheroid, it is plain, there could be no such thing as a tide in any part of the ocean over all the earth; for every section of the spheroid, parallel to the equator, would be a circle; consequently in any parallel of latitude, the water would be at an equal distance from the earth's surface every moment of the diurnal revolution, or natural day.

Suppose the moon were removed from the direction of the earth's axis, and posited at S (*ibid.* fig. 3.) then will the axis of the aqueous spheroid A B be turned towards S, and make an angle with the earth's axis, as A T P or B T N. Then we observe, that since C, D, are the places of lowest water, that parallel I K which passes through the point I on one side the equator, and L M which passes through M on the other, will divide the earth into three zones, in two of which, *viz.* E N K and L P M, there will be but one tide each day, of the same kind; for instance, in the parallel E F, a person at F will have high water, and at E low water for twelve hours after. Again, in all the zone I K M L, there will be two tides of the same kind each day, as is evident from the figure. These limits, or the arch Q I or O M, is the complement of the moon's declination from the equator.

If the moon at S (*ibid.* fig. 4.) be over the equator, the longer axis of the spheroid A B will now coincide with the plane of the equator Q O, and the shorter axis C D with the axis of the earth N P. Here it is obvious, that in this situation of the spheroid, the waters in the parts A B, with respect to those at C D, will give the greatest difference of high and low water possible to all parts of the earth; and that there is no place but those two at the poles N, P, but what has two tides of flood, and two of ebb every twenty four hours. And this difference of the flux and reflux will decrease from the equator to the poles.

It has been already observed, that the greatest

greateſt elevation of the waters is not when the luminary is in the meridian, but about three hours after, becauſe the motion communicated to the waters during the arrival of the meridian is not immediately deſtroyed, but remains ſome time, and receives a farther augmentation from that which is impreſſed for about three hours after. For the ſame reaſon, we obſerve, the greateſt and leaſt tides happen not on the day of the ſyzygy, or quadrature, but on the third or fourth after; the ſum or difference of the forces of the luminaries not being till then at a maximum. See the article SYZYGY.

Let SFEG (*ibid.* fig. 5.) be the orbit of the moon about the earth QNOP, which as it is not circular but elliptical, the center of the earth T will not be always at an equal diſtance from the moon; but the moon will be ſometimes neareſt the earth, as when at S, and ſometimes fartheſt off, as at E. The point S is called the perigæum, or perigee; and the point E the apogæum, or apogee. The power of the moon in her perigee is to that in the apogee nearly as $TE^3$ to $TS^3$; and conſequently the greateſt tides will be on the day of the perigee, or rather a few days after, for the reaſons above-mentioned. Such would the tides regularly be, if the whole earth were covered with deep ſea; but by reaſon of the ſhoalneſs of ſome places, and the narrowneſs of the ſtreights, by which the tides are, in many places, propagated, there ariſes a great diverſity in the tides not to be accounted for without an exact knowledge of all the circumſtances of the ſeveral places where they happen; as of the poſition of the land, the breadth and depth of channels, *&c.*

That the tides may have their full motion, the ocean in which they are produced ought to be extended from eaſt to weſt 90°, or a quarter of a great circle of the earth, at leaſt; becauſe the places where the moon raiſes moſt, and moſt depreſſes the water, are at that diſtance from one another. Hence it appears, that it is only in the great oceans that ſuch tides can be produced; and why, in the large Pacific ocean, they exceed thoſe in the Atlantic ocean: hence alſo it is obvious, why the tides are not ſo great in the torrid zone, between Africa and America, where the ocean is narrower, as in the temperate zones on either ſide; and from this alſo, we may underſtand why the tides are ſo ſmall in iſlands, that are very far diſtant from the ſhores. It is manifeſt, that, in the Atlantic ocean, the water cannot riſe on one ſhore but by deſcending on the other; ſo that, at the intermediate diſtant iſlands, it muſt continue at about a mean height betwixt its elevation on the one and on the other ſhore.

As the tides paſs over ſhoals, and run through ſtreights into bays of the ſea, their motion becomes more various, and their height depends on a great many circumſtances. The tide, that is produced on the weſtern coaſt of Europe, correſponds to the theory above deſcribed: thus, it is high water on the coaſt of Spain, Portugal, and the weſt of Ireland, about the third hour after the moon has paſſed the meridian: from thence it flows into the adjacent channels, as it finds the eaſieſt paſſage. One current from it, for example, runs up by the ſouth of England, and another comes in by the north of Scotland: they take a conſiderable time to move all this way, and it is high-water ſooner in the places to which they firſt come; and it begins to fall at thoſe places, while the two currents are yet going on to others that are farther in their courſe. As they return, they are not able to raiſe a tide; becauſe the water runs faſter off than it returns, till, by a new tide propagated from the ocean, the return of the current is ſtopped, and the water begins to riſe again. The tide takes twelve hours to come from the ocean to London-bridge, ſo that, when it is high water there, a new tide is already come to its height in the ocean; and, in ſome intermediate place, it muſt be low water at the ſame time. In channels, therefore, and narrow ſeas, the progreſs of the tides may be, in ſome reſpects, compared to the motion of the waves of the ſea. Our author alſo obſerves, that when the tide runs over ſhoals, and flows upon flat ſhores, the water is raiſed to a greater height than in the open and deep oceans that have ſteep banks; becauſe the force of its motion cannot be broke, upon theſe level ſhores, till the water riſes to a greater height.

If a place communicates with two oceans (or two different ways with the ſame ocean, one of which is a readier and eaſier paſſage) two tides may arrive at that place in different times, which, interfering with each other, may produce a great variety of phænomena. An extraordinary inſtance of this kind is mentioned

tioned by our author at Bathſha, a port in the kingdom of Tunquin in the Eaſt-Indies, of northern latitude 20° 50′. The day in which the moon paſſes the equator, the water ſtagnates there without any motion: as the moon removes from the equator, the water begins to riſe and fall once a day; and it is high water at the ſetting of the moon, and low water at her riſing. This daily tide increaſes for about ſeven or eight days, and then decreaſes for as many days by the ſame degrees, till this motion ceaſes when the moon has returned to the equator. When ſhe has paſſed the equator, and declines towards the ſouth pole, the water riſes and falls again, as before; but it is high water now at the riſing, and low water at the ſetting, of the moon.

This theory of tides has been extended ſo far, as to eſtimate the tides, or elevations of the waters of the moon, produced by the attraction of the earth: thus, let us ſuppoſe the quantity of matter (Q) in the earth to be to that in the moon ($q$) as 40 to 1, that is, $Q : q :: 40 : 1$; and let us firſt ſuppoſe the earth and moon of equal bulk, and repreſented by AIK (*ibid.* fig. 6.) and BDE, and the force (F) of the earth, at the ſurface of the moon B, will be to the force (f) of the moon at the ſurface of the earth A, directly as the maſſes of matter in each (becauſe of the equal diſtances TB and LA) that is, $F : f :: Q : q :: 40 : 1$. Again, let LB be to LC as the diameter of the earth to that of the moon, which is as 365 to 100, then will the force at B be to the force at C as LB to LC, which let be as F to $f$, then $F : f :: 365 : 100$, whence $F = \frac{365 f}{100}$; and above we have $F = 40 f$, therefore $4000 f = 365 f$; and ſo $f : f :: 365 : 4000 :: 1 : 11$ nearly; that is, the power of the earth to raiſe the water at the moon C, is to that of the moon at the earth A as 11 to 1, very nearly.

If the moon can raiſe the water here 10 feet, the earth can raiſe the water there to the height of 110 feet; but becauſe the moon always turns about her axis in the ſame time as ſhe revolves about the earth, the waters (if any there be) will be raiſed on this and the oppoſite ſide, and always continue over the ſame part of the moon's ſurface, ſo that there can be no different heights of water there, and conſequently no tides, except what ſmall ones may happen on account of the ſun's attraction, and her various inequalities of motion, and diſtance from the earth.

The air, which is 860 times lighter than water, muſt yield in proportion more eaſily to the attracting force of the ſun and moon; and therefore the tides will in this profound and vaſt aërial ocean be very conſiderable and importing: but of this the reader may expect a further account under the articles ATMOSPHERE, HEAT, WIND, *&c.*

TIDE-WAITERS, or TIDESMEN, are inferior officers belonging to the cuſtom-houſe, whoſe employment it is to watch or attend upon ſhips, until the cuſtoms be paid: they get this name from their going on board ſhips, on their arrival in the mouth of the Thames or other port, and ſo come up with the tide.

TIDOR, one of the Molucca iſlands, ſituated in 125° eaſt long. and 1° north lat.

TIERACHE, the moſt eaſterly diviſion of Picardy, in France.

TIERCE, or TEIRCE, a meaſure of liquid things, as wine, oil, *&c.* containing the third part of a pipe, or forty-two gallons. See the article MEASURE.

TIERCE, in gaming, a ſequence of three cards of the ſame colour. See the articles PICQUET and QUADRILLE.

TIERCED, *tierce*, in heraldry, denotes the ſhield to be divided by any of the partion-lines, as party, coupy, tranchy, or tailly, into three equal parts of different colours or metals.

TIGE, in architecture, a french term for the ſhaft or fuſt of a column, comprehended between the aſtragal and the capital. See COLUMN and SHAFT.

TIGER, or TYGER, *tigris*, in zoology, an animal belonging to the felis-kind, with an enlongated tail, and virgated ſpots. See the article FELIS.

The tiger is a large and terrible animal, exceeding the lion both in ſize and fierceneſs; being at its full growth of the bigneſs of a ſmall heifer: its head is large, and the teeth enormouſly long: the fore-legs are very thick and ſtrong, and the tail is long: the ground colour in the tiger is a pale tawney, with an admixture of brown; but it is all over variegated with ſtreaks of black. See plate CCLXXVII. fig. 3.

The tiger has its name from its ſuppoſed ſwiftneſs, and has been deſcribed by almoſt all authors as one of the ſwifteſt of all the wild carnivorous animals; but this has been wholly contradicted by ſuch authors as have ſeen the creature, who all declare

declare that it is a flow and fluggifh animal, and is unable to overtake a man, or almoft any animal that has an opportunity of running away from it. It will give two or three large leaps; but if it do not feize its prey in thefe, is but ill qualified to catch it afterwards.

TIGER-SHELL, a beautiful fpecies of voluta, of a dufky red colour, fpotted all over with large irregular blotches of white: it is brought from the Eaft-Indies, and is about two inches and an half in length, and about an inch in diameter. See plate CCLXXXV. fig. 1.

TIGRIS, a large river of Turky in Afia, which, rifing in the mountains of Armenia, runs fouthward, dividing Diarbeck or Mefopotamia, from Curdeftan or the antient Affyria; and having paffed by Bagdat, joins the Euphrates in Eyraca Arabic, or the antient Chaldea. See the article EUPHRATES.

TILBURY, a fortrefs in the county of Effex, fituated on the river Thames, oppofite to Gravefend, twenty miles eaft of London.

TILE, or TYLE, among builders. See the article TYLE.

TILIA, the LIME-TREE, in botany, a genus of the polyandria-monogynia clafs of plants, the corolla of which confifts of five oblong and obtufe petals, crenated at the points: the fruit is a coriaceous, globofe, quinquelocular capfule, containing a fingle roundifh feed in each. However, one feed only of the five ufually ripens, and the very cells of the others often difappear, fo that the fruit feems unilocular. See plate CCLXXVII. fig. 4.

The flowers of the lime tree are efteemed antepileptic, and a fpecific in all kinds of fpafms and pains: they are ufed in infufion, like tea.

The timber of the lime-tree is ufed by the carvers, as being a foft light wood; alfo by architects, for framing the models of their buildings: the turners likewife ufe it for making light bowls, difhes, *&c.* but it is too foft for any ftrong purpofes.

TILLÆA, in botany, a genus of the triandria-trigynia clafs of plants, the flower of which confifts of three ovated, acute, and plane petals; and its fruit of three acuminated and reflex capfules, containing each two oval feeds.

TILLANDSIA, in botany, a genus of the hexandria-monogynia clafs of plants, with a tubulated monopetalous flower, trifid at the limb: the fruit is a long, obtufely trigonal, and acuminated capfule, formed of three valves, and containing only one cell, with numerous feeds affixed to a long capillary plume.

TILLER, in hufbandry, denotes a young tree, left to grow till it be fellable for timber.

TILLER *of a fhip*, a ftrong piece of wood faftened in the head of the rudder, and in fmall fhips and boats called the helm. See the article HELM.

In fhips of war, and other large veffels, the tiller is faftened to the rudder in the gun room: and to the other end there are ropes faftened, which pafs upwards to the quarter-deck, where the fhip is fteered by means of a wheel. See the article STEERING.

TILLAGE, in hufbandry, is the opening, breaking, and dividing the ground by the fpade, the plough, the hoe, or other like inftruments. See the articles PLOWING, HOEING, *&c.*

The finer any land is made by tillage, the richer it will become, and the more plants it will maintain; and it has been frequently obferved, that in a large field, where at fome time one part of the ground has been better tilled than the reft, that part of the ground has produced the beft crops, and been eafily diftinguifhed by it from the reft of the field, even fix or feven crops after the time of the particular good tillage. A piece of ground being once made finer than the reft, will a long time fhew the advantage of it; becaufe the dews have more power to enrich it, they penetrating farther than the fuperficies, whereby the roots are able to enter. The fine parts of the earth are impregnated throughout their whole fubftance with fome of the riches carried in by the dews, and there repofited until, by tillage, the infide of thofe fine parts become fuperficies; and as the corn drains them, they are again fupplied as before; but the rough large parts cannot have that benefit, and the dews not penetrating but to their furface, they remain poor. The experiments mentioned by Mr. Evelyn prove this beyond conteft. Take of the moft barren earth you can find, powder it well, and expofe it abroad for a year, inceffantly agitating it; and after this, without any other management, this earth will be the moft fertile that can be conceived, and will readily receive any plant from the fartheft Indies: all vegetables will profper and flourifh in this once barren earth, and bear



bear their fruit as kindly with us, under a due degree of artificial heat, as in their native climates.

The artificial duſt will entertain plants which refuſe dung and other violent applications, and has a more nutritive power than any artificial dung or compoſt whatſoever: and by this pulveriſing and expoſing, the very nature of a ſoil may be changed, and the tougheſt clay made as light and friable as common light earth, and as fit for the nouriſhment of the tendereſt plants as any other; though, in its natural condition, its pores were too ſmall to give way to their tender roots, and had no communication one with another.

This is a ſort of improvement of land that cannot be practiſed in the large way, in fields, *&c.* but as it only conſiſts in dividing and breaking the particles of earth, and expoſing them thus broken to the air, it is plain that common tillage approaches more or leſs to it, as more or leſs labour is employed; and the experiment proves, that the farmer need never fear beſtowing too much tillage on any ſort of ground.

TILT-BOAT, a boat covered with a tilt; that is, a cloth or tarpawling, ſuſtained by hoops, for the ſheltering of paſſengers.

TIMAR, a tract or portion of land, which the grand ſeignior grants to a perſon on condition of ſerving him in war on horſeback. Hence, thoſe who enjoy ſuch lands, are called timariots; who beſides the above-mentioned ſervice, pay an acknowledgment of one tenth of their revenue.

TIMBER, includes all kinds of felled and ſeaſoned woods. See WOOD.

Of all the different kinds known in Europe, oak is the beſt for building, and even when it lies expoſed to air and water, there is none equal to it. Fir-timber is the next in degree of goodneſs for building, eſpecially in this country, where they build upon leaſes. It differs from oak in this, that it requires not much ſeaſoning, and therefore no great ſtock is required before-hand. Fir is uſed for flooring, wainſcoting, and the ornamental parts of building within doors. Elm is the next in uſe, eſpecially in England and France; it is very tough and pliable, and therefore eaſily worked; it does not readily ſplit; and it bears driving of bolts and nails better than any other wood; for which reaſon it is chiefly uſed by wheel-wrights, and coach-makers for ſhafts, naves, *&c.* Beech is alſo uſed for many purpoſes; it is very tough and white when young, and of great ſtrength, but liable to warp very much when expoſed to the weather, and to be worm-eaten when uſed within doors; its greateſt uſe is for planks, bedſteads, chairs, and other houſhold goods. Aſh is likewiſe a very uſeful wood, but very ſcarce in moſt parts of Europe; it ſerves in buildings, or for any other uſe, when ſcreened from the weather; handſpikes, and oars are chiefly made of it. Wild cheſnut-timber is by many eſteemed to be as good as oak, and ſeems to have been much uſed in old buildings; but whether theſe trees are more ſcarce at preſent than formerly, or have been found not to anſwer ſo well as was imagined, it is certain this timber is now but little uſed. Walnut-tree is excellent for the joyner's uſe, it being of a more curious brown colour than beech, and not ſo ſubject to the worms. The poplar, abel, and aſpen trees, which are very little different from each other, are much uſed inſtead of fir, they look well, and are tougher and harder. See OAK, FIR, ASH, *&c.*

The goodneſs of timber not only depends on the ſoil and ſituation in which it ſtands, but likewiſe on the ſeaſon wherein it is felled. In this, people diſagree very much; ſome are for having it felled as ſoon as its fruit is ripe, others in the ſpring, and many in the autumn. But as the ſap and moiſture of timber is certainly the cauſe that it periſhes much ſooner than it otherwiſe would do, it ſeems evident that timber ſhould be felled when there is the leaſt ſap in it, *viz.* from the time that the leaves begin to fall, till the trees begin to bud. This work uſually commences about the end of April in England, becauſe the bark then riſes moſt freely; for where a quantity of timber is to be felled, the ſtatute requires it to be done then, for the advantage of tanning; ſee TANNING.

The antients chiefly regarded the age of the moon in felling their timber; their rule was to fell it in the wain, or four days after the new moon, or ſometimes in the laſt quarter. Pliny adviſes it to be in the very article of the change, which happening to be in the laſt day of the winter ſolſtice, the timber, ſays he, will be incorruptible. Timber ſhould likewiſe be cut when of a proper age; for when it is either too young, or too old,

it will not be fo durable, as when cut at a proper age. It is faid, that oak fhould not be cut under fixty years old, nor above two hundred. Timber however, fhould be cut in their prime, when almoft fully grown, and before they begin to decay; and this will be fooner or later, according to the drynefs or moiftnefs of the foil, where the timber grows; as alfo according to the bignefs of the trees; for there is no fixt rules in felling of timber, experience and judgment muft direct here as in moft other cafes.

After timber has been felled and fawed, it muft be feafoned: for which purpofe fome advife it to be laid up in a very dry airy place, yet out of the wind and fun, or at leaft free from the extremities of either; and that it may not decay, but dry evenly, they recommend it to be daubed over with cow-dung. It muft not ftand upright, but lie all along, one piece over another, only kept apart by fhort blocks interpofed, to prevent a certain mouldinefs, which they are otherwife apt to contract in fweating on one another; from which arifes frequently a kind of fungus, efpecially if there be any fappy parts remaining. Others advife, the planks of timber to be laid for a few days in fome pool or running ftream, in order to extract the fap, and afterwards to dry them in the fun or air. By this means, it is faid, they will be prevented, from either chopping, cafting, or cleaving, but againft fhrinking there is no remedy. Some again, are for burying them in the earth, others in a heat; and fome for fcorching and feafoning them in fire, efpecially piles, pofts, &c. which are to ftand in water or earth. The Venetians firft found out the method of feafoning by fire; which is done after this manner; they put the piece to be feafoned into a ftrong and violent flame, in this they continually turn it round by means of an engine, and take it out when it is every where covered with a black coaly cruft; the internal part of the wood is thereby fo hardened, that neither earth nor water can damage it for a long time afterwards.

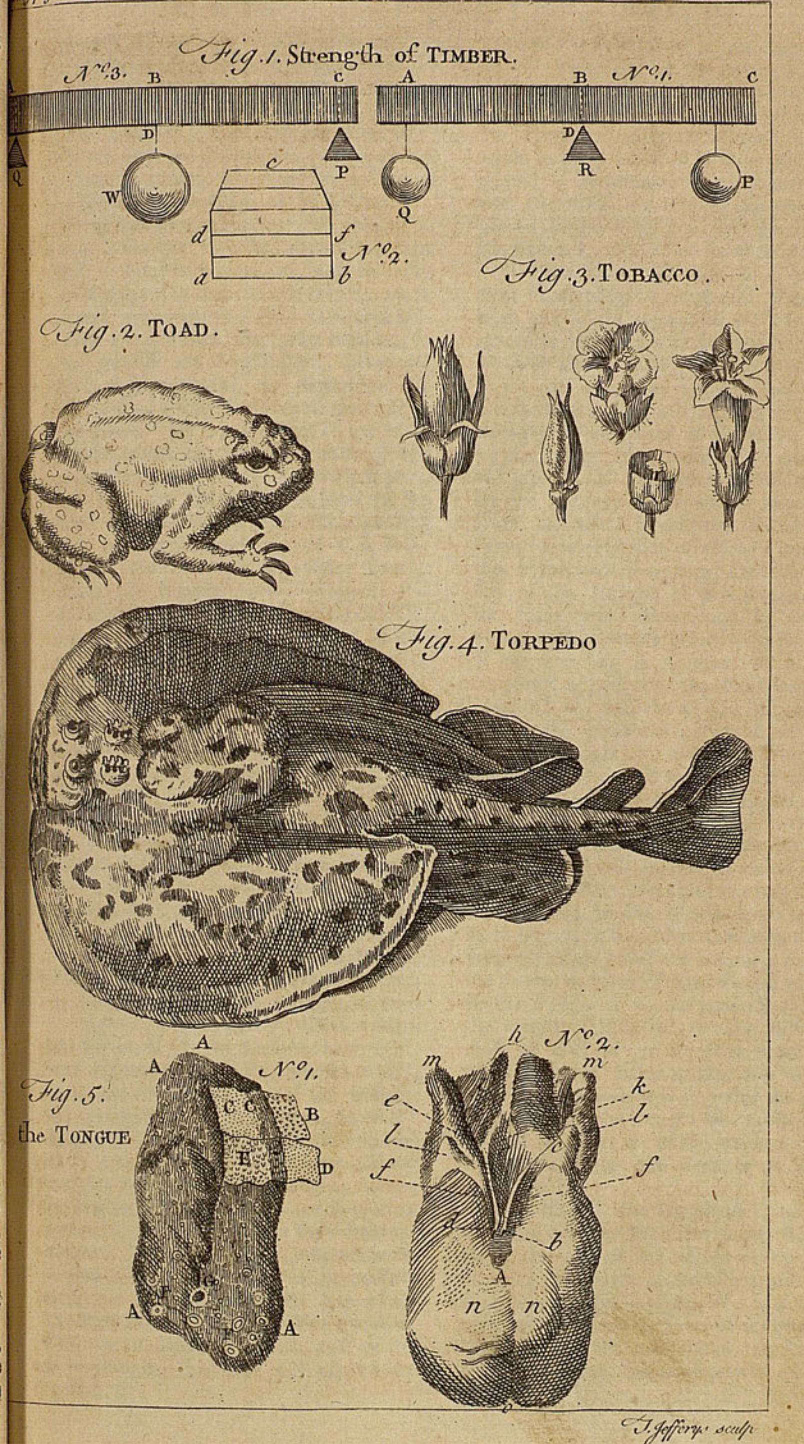
After the planks of timber have been well feafoned and fixed in their places, care is to be taken to defend or preferve them; to which the fmearing them with linfeed oil, tar, or the like oleaginous matter, contributes much. The antients, particularly Hefiod and Virgil, advife the fmoak-drying of all inftruments made of wood, by hanging them up in the chimneys where wood fires are ufed. The Dutch preferve their gates, portcullices, drawbridges, fluices, &c. by coating them over with a mixture of pitch and tar, whereon they ftrew fmall pieces of cockle and other fhells, beaten almoft to powder, and mixed with fea fand, which incrufts and arms them wonderfully againft all affaults of wind and weather. When timber is felled before the fap is perfectly at reft, it is very fubject to the worms; but to prevent and cure this, Mr. Evelyn recommends the following remedy, as the moft approved. Put common fulphur into a cucurbit, with as much aqua fortis as will cover it three fingers deep; diftill it to a drinefs, which is performed by two or three rectifications. Lay the fulphur that remains at bottom, being of a blackifh, or fad red colour, on a marble, or put it in a glafs, and it will diffolve into an oil; with this oil anoint the timber which is infected with worms. This, he fays, will not only prevent worms, but preferve all kinds of woods, and many other things, as ropes, nets, and mafts, from putrefaction, either in water, air, or fnow.

To meafure round timber, let the mean circumference be found in feet and decimals of a foot; fquare it, multiply this fquare by the decimal 0.079577, and the product by the length. Ex. Let the mean circumference of a tree be 10.3 feet, and the length 24 feet. Then $10.3 \times 10.3 \times 0.079577 \times 24 = 202.615$, the number of cubical feet in the tree. The foundation of this rule is, that when the circumference of a circle is 1, the area is 0.0795774715, and that the areas of circles are as the fquares of their circumferences.

But the common way ufed by artificers for meafuring round timber, differs much from this rule. They call one fourth part of the circumference the girt, which is by them reckoned the fide of a fquare, whofe area is equal to the area of the fection of the tree; therefore they fquare the girt, and then multiply by the length of the tree. According to their method, the tree of the laft example would be computed at 159.13 cubical feet only.

For the method of meafuring round timber by the fliding rule, fee RULE.

For meafuring hewn or fquare timber, the cuftom is, to find the middle of the length


Fig. 1. Strength of TIMBER.
No. 3. B C
A B No. 1. C
D Q W P
D R Q P
c d f a b No. 2.
Fig. 3. TOBACCO.
Fig. 2. TOAD.
Fig. 4. TORPEDO
Fig. 5. the TONGUE
No. 1. A A C C B E D G F A A
No. 2. h m m e k l l f f c d b A n n
J. Jeffery sculp.

length of the tree, and there to meaſure its breadth, by clapping two rules to the ſides of the tree, and meaſuring the diſtance betwixt them; in like manner they meaſure the breadth the other way. If the two be found unequal they are added together, and half their ſum is taken for the true ſide of the ſquare.

As to the ſtrength of timber, Mr. Parent is the firſt who has treated this ſubject in a ſcientific manner, and in order to enforce his demonſtrations, he made ſeveral experiments, with various ſcantlings of oak and fir. Mr. Muller, in his treatiſe on fortification, gives the following problem, to determine the ſtrength of a ſcantling, whoſe dimenſions are given. He ſuppoſes that all the fibres of the wood are ſtraight, and of the ſame ſtrength, even in its weakeſt part, and that the fibres are the ſame in the ſame ſort of wood; and although this may not be ſtrictly true, yet it is ſufficiently near enough in practice ſo as to cauſe no ſenſible error. Suppoſe the ſcantling A B C (plate CCLXXIX. fig. 1. n° 1.) to be ſupported in the middle D, by the edge of a triangular block R, and two equal bodies, P, Q, to be ſuſpended at A and C, equally diſtant from the middle B, of ſuch a weight as to break the ſcantling. It is evident, that the weights P and Q will cauſe the ſcantling to bend at firſt, ſo as to make a kind of curvilinear angle at B, and then to break in that place, in a ſection B D, perpendicular to either of the ſides A C; now as the power or force of theſe weights is more or leſs, according as they are ſuſpended farther from, or nearer to the fixed point D; theſe forces will therefore be in proportion to the products of the weights of each multiplied by its reſpective diſtance from the ſection B D; or becauſe the weights and diſtances are here ſuppoſed equal, twice the product of one of the weights P, multiplied by its diſtance, from the ſection B D, and will expreſs the force of theſe two weights. The force of the weights being thus determined, the reſiſtance or ſtrength of the wood is next to be found, which is done in the following manner. Let *a c b* (*ib.* n° 2.) repreſent the ſection of the ſcantling; it is evident that this area repreſents the ſum of all the fibres to be torn or broken; and as they are all ſuppoſed equal, and of the ſame ſtrength, this area will expreſs the ſum of the ſtrength of all the fibres: but as the point D, or the baſe *a b* of the ſection is fixed; and the directions of the fibres perpendicular to the area *a c b*: the force or reſiſtance of each fibre is equal to the product of its ſtrength, multiplied by its diſtance from the baſe *a b*; and therefore the ſum of all the fibres placed in the ſame line *d f*, parallel to the baſe *a b*, multiplied by their diſtance *a d*, from that baſe *a b*, will expreſs their momentum or reſiſtance. What has been proved in regard to all the fibres placed in the line *d f*, is equally true of all thoſe placed in any other line parallel to the baſe *a b*: and therefore the ſum of all theſe products will expreſs the total ſtrength or reſiſtance of the wood: but by the nature of the center of gravity, the product of the aréa *a c b*, multiplied by the diſtance of its center of gravity from the baſe *a b*, will expreſs the total ſtrength or reſiſtance of all the fibres, or that of the whole ſcantling; conſequently, having the ſtrength of any ſcantling of the ſame wood determined by experiment, that of any other may be found.

If the ſcantling A C (*ibid.* n° 3.) be ſupported at both ends by the triangular blocks P Q, and the weight W, hanging in the middle B: then if we ſuppoſe the weight P and Q in the firſt figure, to repreſent the blocks P and Q in this; then as each block ſupports half the weight W; it is evident, that the weight W, multiplied by the diſtance A B or B C, will expreſs its momentum or force. Moreover, ſince the weight W is ſuſpended in the middle betwixt the fixed points, it is evident that each block ſupports exactly half the weight; and as the power or force of this weight on the blocks P, Q, is as the product of half the weight multiplied by the diſtance A B or B C of its direction from the fixed point, it follows, that the whole force of this weight is as twice the product of half the weight W, multiplied by A B or B C; or as the whole weight W multiplied by the diſtance A B or B C.

Hence alſo, if the length A C of the ſcantling between the fixed points A, C, be $c$; the area of the ſection $s$; the diſtance of its center of gravity from the baſe $d$, and the weight W, $w$; then will $\frac{1}{2}cw$ expreſs the force of the weight W, and $ds$ the ſtrength of the ſcantling: therefore the momentum of the weight

weight is to the momentum of the ſcantling is $\frac{1}{2}cw$ is to $ds$; or as $w$ is to $\frac{2ds}{c}$, and if this ratio be given $w = \frac{2ds}{c}$.

From whence may be drawn ſeveral uſeful conſequences. 1. The ſtrengths of two ſcantlings of the ſame wood, and of different dimenſions; or, which is the ſame, the weights they will bear, are to each other as the products of their ſections multiplied by the diſtances of the centers of gravity from the baſe, divided by their lengths. 2. The ſtrengths of two ſcantlings of the ſame wood, which have the ſame length, are as the products of their ſections multiplied by the diſtances of their centers of gravity from the baſe. 3. The ſtrengths of two ſcantlings of the ſame wood, which have equal ſections, are as the diſtances of their centers of gravity divided by their lengths. 4. The ſtrength of ſcantlings of the ſame wood, whoſe diſtances of their centers of gravity of their ſections, from the baſe, are equal, will be to each other as their ſections divided by their lengths.

Again, if the ſection of the ſcantling A C be a rectangle placed flat on one of its ſides, which we call $b$, and its height or other ſide $a$; then will $ab$ expreſs the area of the ſection; and the diſtance $d$ of its center of gravity from the upper baſe, will be $\frac{1}{2}a$, therefore the equation already found $w = \frac{2ds}{c}$ becomes here $w = \frac{aab}{c}$ which ſhews that the ſtrength of a rectangular ſcantling laying flat on one of its ſides, is as the product of the ſquare of its height multiplied by its baſe, and divided by its length. Hence, a deal board of an inch thick, and ten inches broad, being placed on its flat ſide, and then on its narrow ſide; the force in the firſt caſe will be to the force in the ſecond, as 1 is to 10. For the force in the firſt caſe, will be as 10 multiplied by the ſquare of unity; and in the ſecond, as unity multiplied by the ſquare of 10, that is, as 10 is to 100, or as unity is to 10. So that if it bears 50 pounds when it lies flat, it will bear 500 when it lies on the narrow ſide.

TIMBRE, or TIMMER, in heraldry, denotes the creſt of an armory, or whatever is placed at top of the eſcutcheon, to diſtinguiſh the degree of nobility, either eccleſiaſtical or ſecular.

TIME, *tempus*, a ſucceſſion of phænomena in the univerſe; or a mode of duration, marked by certain periods or meaſures, chiefly by the motion and revolution of the ſun.

The idea of time, in the general, Mr. Locke obſerves, we acquire by conſidering any part of infinite duration as ſet out by periodical meaſures: the idea of any particular time, or length of duration, as a day, an hour, &c. we acquire firſt, by obſerving certain appearances at regular, and, ſeemingly, at equidiſtant periods.

Now, by being able to repeat thoſe lengths or meaſures of time, as often as we will, we can imagine duration, where nothing really endures or exiſts; and thus we imagine to-morrow, next year, &c.

Some of the latter ſchool-philoſophers define time to be the duration of a thing, whoſe exiſtence is neither without beginning nor end: by which time is diſtinguiſhed from eternity.

Time is diſtinguiſhed into abſolute and relative. Abſolute time, is time conſidered in itſelf, and without any relation to bodies, or their motions. This flows equally, *i. e.* never proceeds faſter or ſlower, but glides on in a conſtant, equable tenor. Relative time, is the ſenſible meaſure of any duration by means of motion. For ſince that equable flux of time does not affect our ſenſes, nor is any way immediately cognizable thereby, there is a neceſſity for calling in the help of ſome nearly equable motion to a ſenſible meaſure, whereby we may determine its quantity, by the correſpondency of the parts of this with thoſe of that.

Hence, as we judge thoſe times to be equal which paſs, while a moving body, proceeding with an equable velocity, paſſes over equal ſpaces; ſo we judge thoſe times to be equal which flow while the ſun, moon, and other luminaries, perform their revolutions, which, to our ſenſes, are equal.

But ſince the flux of time cannot be accelerated, nor retarded, whereas all bodies move ſometimes faſter and ſometimes ſlower, and there is, perhaps, no perfectly equable motion in all nature, it appears hence to follow, that abſolute time ſhould be ſomething truly and really

really diſtinct from motion. For let us ſuppoſe the heavens and ſtars to have remained without motion from the very creation, does it hence follow, that the courſe of time would have been at a ſtand ? Or, rather, would not the duration of that quieſcent ſtate have been equal to the very time now elapſed ?

*Aſtronomical* TIME, is that taken purely from the motion of the heavenly bodies without any other regard.

*Civil* TIME, is the former time accommodated to civil uſes, and formed and diſtinguiſhed into years, months, days, *&c.*

TIME, in muſic, is an affection of ſound, whereby we denominate it long or ſhort, with regard to its continuance in the ſame degree of time. See the article SOUND.

Common, or duple time, is of two ſpecies. 1. When every bar or meaſure is equal to a ſemi-breve, or its value, in any combination of notes of a leſſer quantity. 2. When every bar is equal to a minim, or its value, in leſſer notes. The movements of this kind of meaſure are various, but there are three common diſtinctions ; the firſt ſlow, ſignified by the mark C ; the ſecond briſk, ſignified by ; the third very quick, ſignified by .

For triple time, ſee the article TRIPLE.

TIME, in fencing. There are three kinds of time ; that of the ſword, that of the foot, and that of the whole body. All the times that are perceived out of their meaſure, are only to be conſidered as appeals, or feints, to deceive and amuſe the enemy. See the article FENCING.

TIMOR, an iſland in the Indian-ocean, ſituated between 122° and 126° of eaſt long. and between 8° and 10° ſouth lat. It is in the poſſeſſion of the Dutch, and ſaid to have gold mines.

TIN, *ſtannum*, ♃, a well-known whitiſh metal, ſofter than ſilver, yet much harder than lead. See the article METAL.

Tin is the lighteſt of all the metals : it is remarkable for a quality that no other of them has, which is, that when bent it makes a crackling noiſe. It is harder than lead, but leſs ſo than any other of the metals : it is malleable in a very remarkable degree, though leſs ſo than lead: it may be eaſily drawn into a coarſe wire, but if this be attempted to be brought to any degree of fineneſs, it ſnaps and breaks under the workman's hands.

Tin is leſs ſuſceptible of ruſt than moſt of the other metals : it is very little elaſtic, and ſcarce at all ſonorous. It melts with a much ſmaller degree of fire than any other metal, a heat but a little greater than boiling-water being ſufficient to fuſe it. It melts before it grows red-hot, like lead : and a degree of heat ſo much leſs even than that requiſite to the running of lead, is neceſſary to the fuſing of this metal, that it may be eaſily ſeparated from the other by eliquation ; and if the fire be kept under a mixed maſs of the two, ſo low as to be juſt hot enough to melt the lead, the tin will all run off from it.

Tin amalgamates very readily with mercury, and may be mixed in fuſion with moſt other metals, and as readily ſeparated from them again by the beforementioned proceſs of eliquation. It is the leaſt ſimple of all the metals, being brought, by a very ſmall degree of fire, to emit ſulphureous fumes : theſe are plainly the abſolute ſulphur of the metal. They do great injury to the people employed to work upon it, rendering them pale, and often abſolutely deſtroy them. The conſequence of the emitting theſe fumes ſo abundantly is, that tin, of all metals, loſes moſt of its weight, and calcines moſt eaſily in the fire. Expoſed to the focus of a great burning-glaſs, it immediately melts, and ſends off a large quantity of thick, white fume ; the remaining matter is then a fine cryſtalline or gloſſy matter, in form of needles ; theſe, if held ever ſo long in the ſame heat, undergo no farther change, never running into a maſs of glaſs, as the remains of moſt of the metals do under the ſame circumſtances ; but, like the glaſſes of the other metals, if expoſed again to the ſame heat, laid on a piece of charcoal, they immediately run into tin again ; and the ſame thing happens if it be continued on the tile or coppel it was firſt placed on in the focus, and ſome fat matter, as tallow, or the like, to be added to it. Filings of tin thrown into the flame of a candle, take fire, and render the flame blue, emitting a viſible fume, and a ſmell of garlic : melted in a crucible, with a mixture of nitre, it deflagrates. Its conſtituent matters, therefore, ſeem to be a cryſtalline earth which melts with great difficulty, and an inflammable ſulphur ; in which, from its ſmell, while calcining, and from its poiſonous quality, it is probable there may be ſomething of arſenic mixed.

For the ſpecific gravity of pure tin, ſee the article GRAVITY.

Tin ſo far endures the force of lead and antimony in the refiner's teſt, that it is hardly to be ſeparated from them, unleſs by the addition of copper: it adheres to the reſt of the metals with greater eaſe than any other, and hence it is in continual uſe in covering plates of iron, and lining copper, and other metals, to prevent their ruſting, and to ſave the liquids put into them from taking up any bad qualities from thoſe metals as it is much more difficultly diſſolved by common menſtruums than either of them.

Tin, in many things, greatly approaches to the nature of ſilver. It very readily melts with ſilver, gold, or copper; when the mixture is made with equal, or even a leſs quantity, it renders them extremely brittle: but it is very ſingular, that if it be mixed in a much larger quantity, they ſtill continue pliant and flexile. Ten parts of tin, and one of copper, make a maſs more rigid indeed than tin, yet malleable and ductile. Silver, of all metals, ſuffers moſt by an admixture of tin, a very ſmall quantity of it ſerving to make that metal as brittle as glaſs; and what is worſe, being very difficultly ſeparated from it again. The addition of about one tenth part of copper to tin makes it fit for the common uſes of life, in veſſels of various kinds, as it becomes, by the mixture, more durable; a little zink, added to this mixture, gives the metal a yellow colour; and, as it is mixed in greater or leſs quantity, makes it fit for caſting of cannon and for bells.

Iron readily mixes with tin, in fuſion, if the fire be briſk, and the iron be heated white hot before the tin be added. Twice the quantity of this metal, added to iron ſo heated, readily runs with it into an odd ſubſtance, which is very white and brittle, and readily anſwers to the magnet. This has been uſed, by ſome, as a pretence of its not being iron, and that the loadſtone would attract another metal beſide that: but the fallacy is eaſily diſcovered by any one that underſtands any thing of metallurgic analyſis.

Lead bears a conſiderable admixture of tin, without being affected as gold and ſilver are, which are both rendered brittle by it; at leaſt, its effects on this metal are in a much ſmaller degree. The very vapour of tin has the ſame effect with the metal itſelf on ſilver, gold, and copper, rendering them brittle. Many a metallurgiſt has been long plagued by theſe vapours by a piece of tin being accidentally among his charcoal; the conſequence of which has been, that, till it was burned wholly away, theſe metals have been rendered as brittle as glaſs under the hammer, by only being fuſed over theſe coals. It is owing to this property of tin, in making the metals it is mixed with brittle, that it renders them ſonorous. Mr. Boyle has expreſſed a wonder that tin, which is itſelf not much ſonorous, ſhould on mixture with copper render it more ſo; but if we conſider that the ſame ſort of diſpoſition of parts which renders metals rigid and brittle renders them ſonorous, the myſtery is explained.

The proper ſolvent of tin, in its true malleable ſtate, is aqua regia. It will not well diſſolve in any of the other menſtrua of the ſtronger kinds, nor indeed very readily in this. We are not, however, to wonder at this difficulty of ſolution in tin, ſince we find it contains much more ſulphur than any other metal, and ſulphur is not one of thoſe ſubſtances that are to be diſſolved by acids. That this is a fact we find by putting calcined tin, inſtead of common malleable tin, into the menſtruum, for in this caſe even vinegar will diſſolve it. While tin is in its malleable ſtate, the weakeſt acids diſſolve it beſt. Verjuice, and it is ſaid even ſour apples boiled in tin veſſels, acquire a taſte of that metal, though the ſtrongeſt acids, aqua regia excepted, boiled in the ſame veſſels, acquire no flavour from it at all.

Many of the chemical writers have been of opinion, that, if the ſulphur could be thoroughly purged from tin, it would be no longer tin, but ſilver; it is certain that the two metals have many things in common. If diſſolved in aqua regia, tin is bitter, as well as ſilver, in ſolution with the nitrous acid; but the cryſtals which are produced from a ſolution of it in vinegar, after it has been calcined for forty-eight hours together, which is a neceſſary ſtep towards ſuch a ſolution, (and which one would think ſhould bring it nearer to ſilver than before, if the diſſipating its ſulphur were the way to do it,) differ wholly from thoſe of ſilver. We have indeed accounts, in many authors, of tin being made to yield a large quantity of ſilver by peculiar proceſſes; but that careful experimenter, Mr.

Mr. Boyle, tells us, that all tin is not to be expected to yield thofe advantages in the fame manner, for that himfelf had feparated pure cryftals of filver from one parcel of tin by a peculiar menftruum, but that another parcel of the fame metal would not anfwer in the fame manner.

Though tin and lead readily unite in fufion over a gentle fire, if the heat be afterwards raifed to a violent degree, there is a vifible motion excited in the mixture; and the confequence is, that both are reduced to a calx, and the lead becomes extremely difficult afterwards to vitrify.

The effect that zink has upon a mixture of tin and copper, the copper being in a larger proportion than has been ufually given in fuch mixtures, is little known, and feems to be a fecret that the people who are poffeffed of it intend to make ufe of to themfelves.

Tin, when it mixes itfelf with cryftal in the earth, influences both its figure and colour. It gives it a pyramidal form confifting of four fides, fhort and with a broad bafe, and at the fame time ufually communicates a yellow colour with an admixture of a dufky brown, which makes it much inferior to the yellow cryftal made fo by lead. Even the tin-grains, though very different fubftances from the cryftals we are defcribing, have fomething of this yellow colour which appears when they are broke into fmall pieces, though in the mafs they are opake and blackifh. In the making of the artificial gems, there is a method of obtaining this colour from tin, and communicating it to glaffes. It feldom fucceeds indeed in the common way of doing this by lead: but in vitrifications, where the bafis is borax, the calx of tin properly treated with vinegar yields cryftals, which will communicate the true colour of the browner topazes to the vitrified mafs.

The ores of tin are very various, as it is found blended with all kinds of fubftances, with marcafitic and ftony matter, and even with other metals. The Germans have lately talked of finding native tin in the perpendicular fiffures of fome of their iron mines; but there feems no foundation for the opinion; for this pretended native tin wants the firft of all the characters of a native metal, malleability. It flies to pieces under the hammer, and on trial in the fire proves to be a marcafitic ore, very rich indeed in tin, a very fingular and valuable fubftance, but not, as pretended, native tin. This remarkable ore is found in nodules from an ounce to three or four in weight; it is of a bright filvery colour, like the white arfenical pyritæ, but covered with a coarfe dufky cruft: when properly worked, it is the richeft tin-ore to be met with, five drachms of pure tin having been feparated from an ounce of it.

The next ore to this in richnefs, and that which has confequently been ufually accounted the richeft of all, is the tin-grain, or lapis jovius. This is an ore of tin, of a fine gloffy black colour on the outfide, but, in thin pieces held up againft the light, it is tranfparent and yellowifh: it is the heavieft of all the metalline ores, and is of a very irregular figure, but in the fineft pieces it feems to approach to the fhape of thofe cryftals which are found joined bafe to bafe, without any intermediate column. In fize it is of the bignefs of a large walnut down to that of a pin's head; for of that minutenefs we meet with fome perfect tin-grains.

After the tin-grain we fhall mention a black and very heavy tin-ore, of an irregular figure and metalline appearance; but this, though it promifes very fairly by its weight, feldom yields fo much as half a drachm of metal from the ounce, in its crude ftate; if wafhed indeed, and all the foreign matter carried off, it may be reduced almoft to the purity of the tin-grains before the working.

The tin-ores of Germany ufually contain a very large quantity of iron; ours are free from this admixture, and are greatly the more valued for it. Our other ores of tin, befides the two above defcribed, are a brownifh or blackifh ftony one, very hard and heavy; this is debafed by a great quantity of the ftony matter, and requires careful wafhing before it is brought to the fire; and a yellowifh or whitifh ore; which are lefs heavy and more brittle than the others, and contain a large quantity of common fulphur; and to thefe may be added another, in which the metal is yet more mixed with fulphur: this is the mundic found in the tin-mines, which is very bright and fhining, of a filver or gold colour, and often contains a large portion of tin, though it is not feparated from it without difficulty, becaufe of the abundance of fulphur in the mafs. We have alfo a red ore of tin, of a ftony,

and ſometimes of an earthy nature, and carrying ſo little of the appearance of an ore of this metal, than it is hard to gueſs what could lead any body to work it in expectation of it. It is however very rich.

Tin-ore is alſo ſometimes found mixed with that of lead, and carrying the external appearance of lead only. Some of theſe ores are neglected in France, where they might turn to a very conſiderable account under proper management. The German ores of tin are uſually ſo much like iron, that, at firſt ſight, it is ſcarce poſſible to diſtinguiſh them. We are alſo finally to add to the number of tin-ores the dodecahedral garnets ſold by our druggiſts; theſe are in general irregularly figured, but the moſt regular of them always conſiſts of twelve ſides; they are of a deep red colour, and in ſize from the bigneſs of the largeſt pea to that of a pin's head. Theſe are truly ores of tin, of the nature of the tin-grains, but not ſo rich. See GARNET, *&c.*

There is ſomething very ſingular in the great gravity of tin-ore beyond that of the ores of other metals; but it contains ſo much arſenic, and is ſo dangerous to the perſon who works it, that experiments are not expected to be made very frequently on it. The tin-ores in general are ſtubborn and refractory in the fire; it is eaſy, however, to find whether an ore does contain this metal or not; for if a piece of it be powdered and waſhed, and afterwards ſprinkled thinly over an iron-plate made white hot on the fire, the tin-ore, in this caſe, if there be any in the maſs, will be found in little parcels of a red colour covered with grey flowers of an arſenical ſmell. The various kinds of mundic common in the corniſh mines are not only rejected from the works as ores themſelves, but they are carefully ſeparated from among the other ores of a better kind, as they are apt to be very troubleſome, even in the ſmalleſt quantities, in working the reſt. They then pound and waſh the ore; and when they have thus ſeparated all the lighter impurities, till there is no longer any ſmell of ſulphur or of garlic, they grind it to a tolerably fine powder, and, after waſhing it again, it is carried to the melting-houſes, where it is melted into metal by mixing it with charcoal, and urging the fire to the utmoſt violence by the blaſt of large bellows. There is a cavity at the bottom of the furnace into which the metal runs, as it ſeparates from the ore, and out of which they let it by an aperture cloſed and opened at pleaſure, running it into cakes or pigs, which are the large blocks we ſee it in.

Tin-ore, in general, contains a great quantity of arſenic, which diſcovers itſelf in the roaſting in form of a white cloud, and which it is very material to burn quite away, as it otherwiſe renders the metal brittle. Charcoal alone commonly ſerves for fluxing the ore of tin, but, if any be found very refractory, a little common black pitch is an excellent addition. See the article FLUX.

The virtues of tin, as a medicine given internally, have been celebrated by many of the antient writers, but it has leſs credit at preſent. We have been told that in diſeaſes of the lungs, and in diſorders of the head and uterus, there is ſcarce any thing equal to it; and that in convulſions, epilepſies, and the madneſs ariſing from the bite of a mad dog, it was a certain remedy. Theſe laſt are the only caſes in which it has any degree of credit at preſent, and that is rather among the vulgar than among phyſicians. In the manufactures it is of great uſe in ſolders, and when amalgamated with mercury, and a little biſmuth added to make it run thin, it ſerves in the ſilvering of looking-glaſſes. By calcination it makes a ſoft powder called putty, of great uſe in poliſhing glaſs and gems, and alſo in making enamels.

The preparations of tin are, 1. Powdered tin, made by pouring melted tin into a wooden box, the inſide of which is chalked all over, and briſkly ſhaking it till cold, when a part of it will be found reduced to powder, which is ſaid to be good for worms, but we have no certain accounts of its good effects. 2. Salt of tin, obtained by pouring diſtilled vinegar upon calcined tin, heating the ſolution till it near boils, and afterwards evaporating it to a pellicle, and ſetting it in a cool place; then there will ſhoot very pellucid and hard cryſtals, which are recommended in hyſteric caſes, to be given from two to four or five grains at a doſe. 3. The antihectic of Poterius. 4. The aurum muſivum. See the articles ANTIHECTICS and AURUM.

To theſe preparations uſed in medicine, we may add one well known as a coſmetic: it is a magiſtery of tin prepared in the manner of that of biſmuth, by firſt mixing ſix ounces of ſpirit of nitre with

with one ounce of ſpirit of ſea-ſalt, and then putting tin into this liquor, or aqua regia, till it is capable of holding no more: laſtly, pour the ſolution into ſix or eight quarts of ſpring-water, and the tin will be precipitated in form of a white powder, which ſhould be waſhed ſeveral times, and then dried for the uſe of the ladies in pomatums, to render the ſkin white and ſoft.

TINA, a town of european Turky, on the confines of Dalmatia, ſituated in eaſt long. 18°, north lat. 44° 6′.

TINCA, the TENCH, in ichthyology. See the article TENCH.

TINCTURE, *tinctura*, in pharmacy and chemiſtry, a ſeparation of the finer and more volatile parts of a mixed body, made by means of a proper menſtruum diſſolving and retaining the ſame. See MENSTRUUM and SOLUTION.

Rectified ſpirit of wine diſſolves the volatile oils and reſins of vegetables, whilſt water acts more immediately on their mucilaginous and ſaline matter. Hence, in whatever proportion the ſoluble parts of any vegetable are blended together, a ſpirit may be ſo adjuſted thereto by art, as entirely to diſſolve the whole, and conſequently to extract all the virtues of the ſubject, without any of the uſeleſs or woody parts. Fixed alkaline ſalts deepen the colour of ſpirituous tinctures, but add nothing to the diſſolving power of the menſtruum: nor is the addition of theſe ſalts uſeleſs only, but likewiſe prejudicial, as they injure the flavour of aromatics, and ſuperadd a quality ſometimes contrary to the intention of the medicine. Volatile alkaline ſalts, in many caſes, promote the action of the ſpirit; but acids, almoſt univerſally, weaken it. See ALKALI and ACID.

As to the method of extracting tinctures, the following general rules may be of uſe in this reſpect. 1. The vegetable ſubſtances ought to be moderately and newly dried, unleſs they are expreſly ordered otherwiſe; they ſhould likewiſe be cut and bruiſed before the menſtruum is poured on them. 2. If the digeſtion is performed in balneo, the whole ſucceſs depends upon a proper management of the fire: it ought to be all along gentle, unleſs the hard texture of the ſubject ſhould require it to be augmented; in which caſe the heat may be ſo increaſed as to make the menſtruum boil a little towards the end of the proceſs. 3. Very large circulatory veſſels ought to be employed for this purpoſe, which ſhould be heated before they are luted together. A commodious circulatory may be compoſed of two long-necked matraſſes or bolt-heads, the mouth of one of which is to be inſerted into that of the other, and the juncture ſecured by a piece of wet bladder. The uſe of heating the veſſels is, to expel a part of the air; which otherwiſe, rarifying in the proceſs, would endanger burſting them, or blowing off the uppermoſt matraſs. 4. The veſſel is to be frequently ſhaken during the digeſtion. 5 All tinctures ſhould be ſuffered to ſettle before they are committed either to the filter or ſtrainer. 6. In the tinctures, and diſtilled ſpirits likewiſe, deſigned for internal uſe, no other ſpirit, drawn from malt, melaſſes, or other fermented matter, is to be uſed, than that expreſly deſcribed.

Of tinctures there are various ſorts, and for various uſes; cephalic tinctures, antiſcorbutic tinctures, ſtomachic tinctures, anticolic tinctures, and invigorating tinctures; there are tinctures drawn from roſes, from cinnamon, and an infinite number of other ſubſtances, which it would be too tedious to mention.

TINCTURE, in heraldry, the hue or colour of any thing in coat armour, under which denomination may alſo be included the two metals, or and argent, becauſe they are often repreſented by yellow and white. See COLOUR and METAL.

TINE. There are two rivers of this name, the one called North Tine, which riſes on the borders of Scotland; and the other South-Tine, which riſes on the confines of Cumberland; the one running ſouth-eaſt, and the other north-eaſt; they unite their waters at Hexham, and continuing to run eaſt, divide the counties of Durham and Northumberland, paſſing by Newcaſtle, and falling into the German-ſea at Tinmouth.

TINEA, in medicine, a diſeaſe, the ſame with the achor or cruſta lactea. See ACHOR, CRUSTA, and LACTEA.

TIN-GLASS, a name given by ſome to a mineral matter more commonly called biſmuth. See the article BISMUTH.

TINGING *of marble*. The art of doing this has, in ſeveral peoples hands, been a very lucrative ſecret, though there is ſcarce any thing in it that has not at one time or other been publiſhed. Kircher has the honour of being one of the firſt, who publiſhed any thing practicable about it. This author meeting with ſtones in

ſome cabinets ſuppoſed to be natural, but having figures too nice and particular, to be ſuppoſed of nature's making, and theſe not only on the ſurface, but ſunk through the whole body of the ſtones, was at the pains of finding out the artiſt, who did the buſineſs; and on his refuſing to part with the ſecret on any terms, this author, with Albert Gunter, a Saxon, endeavoured to find it out; in which they ſucceeded at length very well. The method is this: Take aqua fortis and aqua regia of each two ounces, ſal armoniac one ounce, ſpirit of wine two drams, about twenty-ſix grains of gold, and two drams of pure ſilver; let the ſilver be calcined and put into a vial, and pour upon it the aqua fortis; let this ſtand ſome time, then evaporate it, and the remainder will firſt appear of a blue and afterwards of a black colour. Then put the gold into another vial, pour the aqua regia upon it, and when it is diſſolved, evaporate it as the former. Then put the ſpirit of wine upon the ſal armoniac, and let it be evaporated in the ſame manner. All the remainders, and many others made in the ſame manner from other metals, diſſolved in their proper acid menſtrua, are to be kept ſeparate, and uſed with a pencil on the marble. Theſe will penetrate without the leaſt aſſiſtance of heat, and the figure being traced with a pencil on the marble, the ſeveral parts are to be touched over with the proper colours, and this renewed daily till the colours have penetrated to the deſired depth into the ſtone. After this, the maſs may be cut into thin plates, and every one of them will have the figure exactly repreſented on both ſurfaces, the colours never ſpreading. The niceſt method of applying theſe, or the other tinging ſubſtances, to marble, that is to be wrought into any ornamental works, and where the back is not expoſed to view, is to apply the colours behind, and renew them ſo often till the figure is ſufficiently ſeen through the ſurface on the front, though it does not quite extend to it. This is the method that, of all others, brings the ſtone to a nearer reſemblance of natural veins of this kind.

TINMOUTH, a port-town of Northumberland, ſituated on the German-ſea, at the mouth of the river Tine, ſeven miles eaſt of Newcaſtle.

TINNING, the covering or lining any thing with melted tin, or with tin reduced to a very fine leaf. Looking-glaſſes are foliated, or tinned, with thin plates of beaten tin, the whole bigneſs of the glaſs, applied or faſtened thereto by means of quickſilver. See the article FOLIATING.

The plumbers, on ſome occaſions, tin or whiten their ſheets of lead, in order to which they have a tinning-furnace, filled with live coal, at the ſides whereof two men are placed, who hold up the ſheets over the fire to heat; and the tin leaves being laid over them as faſt as the ſheets grow hot, and the tin melts, they ſpread it, and make it take by rubbing it with tow and roſin.

TINNITUS AURIUM, a noiſe or buzzing in the ear, when it receives ſounds which do not exiſt, or at leaſt which are not produced by the motion of the external air; and the ear being filled with a certain ſpecies or ſound, cannot admit other ſounds, unleſs they are very violent. The tinnitus is of two kinds, the one proceeding from a diſtemperature of the organ of hearing, the other from a diſorder of the brain.

The cure, according to Heiſter, is to be performed by temperate diaphoretic powders, and reſolving eſſences, commonly called anticatarrhales; as of amber, the woods, roſemary, together with diaphoretics and alexipharmics, taken often in a day, with tea of betony, with roſemary-flowers, ſage, or lavender, or ſaſſafras. In the morning, and at noon, the eſſences are to be taken, and at night the powders. Eſſence of amber may be applied outwardly, either alone or with a few drops of oil of amber, or one or two drops of oil of camomile put into the ear with cotton, morning and evening; or a grain or two of amber and muſk, or caſtor, in cotton, either alone or with peruvian-balſam; or carminative oils, ſuch as aniſe, fennel, carraways, or camomile; not neglecting pediluvia, and frequent rubbing of the feet and head. Many have alſo been cured by the vapour of a decoction of lavender-flowers, or roſemary, made with wine, being conveyed to the ear with a funnel. If the diſeaſe is obſtinate and inveterate, the patient muſt bleed in the foot, together with ſcarifications, and frequent purges, for the ſake of revulſion. Ettmuller ſays, this noiſe, proceeding from burning fevers, will go away of itſelf; but if it proceeds from chronic diſorders, it is difficult of cure. However, he recom-

commends vapours of ſouthern-wood, wormwood, origanum, eyebright, balm, &c. as alſo of amber, or gum ammoniac; likewiſe oil of peach kernels, and ſpirit of urine, put into the ear with cotton.

The following formula is greatly praiſed. White hellebore and caſtor, take of each two drachms; of coſtmary, one drachm and a half; of rue, two drachms; euphorbium, half a drachm; of bitter-almonds, two drachms and a half: let them be boiled in the oil of rue, and poured warm into the ear. Shaw recommends half an ounce of oil of bitter-almonds, with two drachms of oil of caſtor, externally applied.

TINNUNCULUS, in ornithology, the ſame with keſtril. See KESTRIL.

TINO, an iſland in the Archipelago, ſituated in eaſt longit. 26°, north lat. 37° 15′.

TINUS LAURISTINE, in botany, a genus of the pentandria-trigynia claſs of plants, the corolla whereof conſiſts of a companulated, ſemiquinquifid, obtuſe petal, with ſubcordated laciniæ: the fruit is a roundiſh unilocular berry, umbilicated, with a cloſe calyx: the ſeed is ſingle and globoſe. Some botaniſts make this genus a ſpecies of viburnum. See the article VIBURNUM.

TIPPERARY, a county of Ireland, in the province of Munſter, lying between King's county on the north, and Waterford on the ſouth.

TIPRA, a country of Aſia, ſituated between India and China.

TIPSTAFF, an officer who attends the judges with a kind of ſtaff tipt with ſilver, and takes into his charge all priſoners who are committed or turned over at a judge's chambers.

TIRE, or TEER *of guns*, in the ſea-language, is a row of cannon placed along a ſhip's ſide, either above, upon deck, or below, diſtinguiſhed by the epithets of upper and lower tires.

TIRLEMONT, a town of Brabant, twelve miles ſouth-eaſt of Louvain, and twenty-one north of Namur.

TIROL, a country of Germany, in the circle of Auſtria, about one hundred and twenty miles long, and ſixty broad, ſubject to the houſe of Auſtria: it is bounded by Swabia and Bavaria on the north.

TITANS, in the heathen mythology, the offspring of Titan, the elder brother of Saturn, upon whom, and his ſon Jupiter, they made war, in order to recover the ſovereignty of which Titan had been deprived. The poets repreſent them as a race of giants, ſprung from the earth, and invading heaven; and tell us, that Jupiter overcame them with thunder, and drove them down to the very bottom of hell.

TITHES, *decimæ*, in law, denote the tenth part of the increaſe that annually ariſes from the profits of lands, and the induſtry of the pariſhioners, which is payable for the maintenance of the parſon of the pariſh.

Tithes, it is obſerved, are of three kinds, predial, perſonal, and mixed. Predial-tithes are ſuch as immediately ariſe from the land, whether it be by manuring or its own nature; as corn, grain, hay, wood, fruit, and herbs, which are ſaid to be due without deducting the coſts. Perſonal-tythes are thoſe which only ariſe from a perſon's labour and induſtry, they being a tenth part of his gains in trade, &c. after charges deducted; but this is ſeldom paid in England, and when it is, it is always due by cuſtom, and payable where the party dwells, hears divine ſervice, &c. Mixed-tithes are ſuch as ariſe not directly from the ground, but from cattle and other things that receive their nouriſhment from and are maintained thereout; as calves, colts, pigs, wool, lambs, milk, &c. Tithes are further divided into great and ſmall; great, are corn, hay, and wood; ſmall comprehend all other predial tithes beſides corn, &c. as likewiſe ſuch tithes as are perſonal and mixed: the great tithes generally belong to the rector, and the ſmall to the vicar.

It has been held, that where land is barren, and not manurable, without extraordinary charge, ſuch land being converted into tillage, ſhall, for the firſt ſeven years after the improvement, be free from paying tithes; but during that ſpace of time it ſhall pay ſmall tithes, as have been uſually paid before, and afterwards the full tithe, according as it is improved: nevertheleſs, if land is ſuffered to be over-run with buſhes, or become unprofitable through want of huſbandry, in that caſe it cannot properly be called barren; and if the ſame be grubbed up, or ploughed and ſowed, it immediately pays tithes.

As to corn it is tithed by the tenth cock, or ſheaf, which if the owner does not ſet out, he is liable to an action upon the

ſtatute; likewiſe where a pariſhioner will not ſow the land, the parſon may bring his action againſt him. On the other hand, when the tithes are ſet forth, if the parſon do not carry them away in a reaſonable time, but lets the ſame be too long on the ground, to the prejudice thereof, he may be alſo ſubject to an action.

The treble damages, granted by ſtatute, are recoverable in the temporal courts by action of debt, thoſe damages not being limited where to be recovered; and it is the opinion of ſome, that the double value, or damages, above-mentioned may be recovered in the ſpiritual court, for this reaſon, that the perſon grieved may ſue in the eccleſiaſtical-court for the tithes themſelves, or a recompence in lieu of the ſame, and may alſo at the ſame time have the double value. Small tithes that are under the value of forty ſhillings, a parſon may recover before two juſtices of peace, who are no way interested in the tithes, within twenty days after demand, and two years after due: and the juſtices may, by diſtreſs, levy the money by them adjudged, upon the party's refuſal to pay it, ten days after notice, &c. The juſtices may likewiſe award coſts not above ten ſhillings, but with liberty to appeal to the quarter-ſeſſions, whoſe judgment ſhall be final, unleſs the title to ſuch tithes ſhall come in queſtion, &c.

Where a quaker refuſes either to pay or compound for great or ſmall tithes, the two next juſtices of the peace may, on complaint thereof made, ſummon ſuch quaker before them, and after examining the matter of complaint on oath, may, by order under their hands and ſeals, direct the payment in all caſes under ten pounds. And if, after ſuch order made, the quaker refuſes to comply therewith, any one of the juſtices may by warrant order the ſame to be levied by diſtreſs, &c. See 7 and 8 Wil. III. c. 34. which, by 1 Geo. I. c. 6. is made perpetual.

Notwithſtanding theſe acts, tithes, if of any conſiderable value, are generally ſued for in the exchequer by engliſh bill, except where the ſuit is founded on the ſtatute of 2 and 3 Ed. VI. for double or treble value, &c.

TITHING, in old law-books, the ſame with decennary. See DECENNARY.

TITLE, *titulus*, an appellation of dignity, or quality, given to princes, and other perſons of diſtinction. Thus, the title of his Britannic majeſty, is king of Great-Britain, France, and Ireland; that of the French king, is king of France and Navarre: and ſo of others. The pope aſſumes the title of holineſs, and the cardinals that of eminence, &c. See the articles KING, PRINCE, DUKE, POPE, CARDINAL, &c.

TITLE, in law, denotes any right which a perſon has to the poſſeſſion of a thing; or an authentic inſtrument, whereby he can prove his right. See the articles RIGHT, PROPERTY, &c.

As to the titles of the clergy, they denote certain places wherein they may exerciſe their functions. There are ſeveral reaſons why a church is called titulus; but that which ſeems to be the beſt, is becauſe antiently the name of the ſaint to whom the church was dedicated, was engraved on the porch, as a ſign that the ſaint had a title to that church; and from thence the church itſelf was afterwards called titulus. In this ſenſe a title ſignifies the church to which a clergyman was admitted, and where he is conſtantly to reſide: and by the canons none ſhall be ordained without a title. This is in order to keep out ſuch from the miniſtry who, for want of maintenance, might bring a diſgrace upon the church: can. 31. In ſhort, according to ſome writers, ſuch a title is an aſſurance of being preferred to an eccleſiaſtical benefice; that is to ſay, a certificate that the clerk is provided of ſome church or place, or where the biſhop that ordains him, intends ſhortly to admit him to a benefice or curacy then void.

TITMOUSE, *parus*, in ornithology, a genus of birds, of the order of the paſſeres, the beak of which is of a ſubulated form, and the point of the tongue truncated.

Of this genus there are many elegant ſpecies, among which the creſted and blue titmouſe are not the leaſt beautiful. See plate CCLXXXV. fig. 6. where n° 1. repreſents the former, and n° 2. the latter.

TITUBATION, or TREPIDATION, a kind of libration, or ſhaking, which the antient aſtronomers attributed to the cryſtalline heavens, in order to account for certain irregularities which they obſerved in the motions of the planets. See PLANET and LIBRATION.

TITUL, a town of Hungary, ſituated on the river Teiſſe, thirty miles north of Belgrade.

TITULAR, denotes a perſon inveſted with a title, in virtue of which he holds an office or benefice, whether he perform the functions thereof or not.

The appellation of titular is frequently alſo given to a perſon who has the title and right of an office or benefice, but without having poſſeſſion, or diſcharging the functions thereof.

TIVERTON, a borough of Devonſhire, ſituated on the river Ex, thirteen miles north of Exeter.

It ſends two members to parliament.

TIVIOT, or CHIVIOT-MOUNTAINS, are high hills on the borders of England and Scotland.

TIVOLI, or TIBUR, a town of Italy, ſituated on the river Tiverone, twenty miles eaſt of Rome.

TLASCALA, a Town of Mexico, and capital of a province of the ſame name, about forty-five miles eaſt of the city of Mexico.

TMESIS, τμησις, in grammar, a figure whereby a compound word is ſeparated into two parts, and one or more words placed between them: thus, for *quæcunque*, Virgil ſays, *quæ me cunque vocant terræ, &c.*

TOAD, *rubeta*, in zoology, belongs to the ſame genus with the common frog. See the article FROG.

The toad is larger than the frog, with a thick body, a broad back, and the belly ſwelled and inflated: its ſkin is conſiderably thick, and full of tubercles, of a duſky and blackiſh colour on the back, and ſpotted on the belly: it is naturally a lothſome and diſagreeable object. See plate CCLXXIX. fig. 2.

TOAD-FLAX, *linaria*, in botany. See the article LINARIA.

TOBACCO, *nicotiana*, in botany, a genus of the pentandria monogynia claſs of plants, the corolla of which conſiſts of a ſingle infundibuliform petal, the limb whereof is patulous, and lightly divided into five ſegments: the fruit is a bilocular capſule, of a nearly oval figure, with a line on each ſide of it, and containing numerous, kidney ſhaped, and rugoſe ſeeds. See plate CCLXXIX. fig. 3.

Tobacco is a native of the eaſt and weſt Indies, and particularly the iſland Tobago, or Tabago; whence the Engliſh name. See the article TABAGO.

After ſowing tobacco-ſeeds, the ground is watered every day, and in hot weather covered, to prevent its being ſcorched by the ſun; and when the plants are grown to a convenient pitch, they are tranſplanted into a ſoil well prepared for their reception: care is alſo taken to keep this ground clear of weeds, and to pull off the loweſt leaves of the plant, that ten or fifteen of the fineſt leaves may have all the nouriſhment. When theſe leaves are ripe, which is known by their breaking when bent, the ſtalks are cut, and left to dry two or three hours in the ſun; after which they are tied together two and two, and hung on ropes under a ſhade to be dried in the air. And when the leaves are ſufficiently dried, they are pulled from off the ſtalks, and made up in little bundles; which being ſteeped in ſea-water, or, for want thereof, in common water, are twiſted in manner of ropes, and the twiſts formed into rolls, by winding them with a kind of mill around a ſtick: in which condition it is imported into Europe, where it is cut by the tobacconiſts for ſmoaking, formed into ſnuff, and the like. See the article SNUFF.

Beſides the tobacco of the Weſt-Indies, there are conſiderable quantities cultivated in the Levant, the coaſts of Greece and the Archipelago, the iſland of Malta and Italy.

The marks of good twiſt-tobacco, are a a fine ſhining cut, an agreeable ſmell, and that it have been well kept. Tobacco is either taken by way of ſnuff, as a ſternutatory, or as a maſticatory, by chewing it in the mouth, or by ſmoaking it in a pipe. It is ſometimes alſo taken in little longiſh pellets put up the noſe, where it is found to produce very good effects, to attract a deal of water or pituita, unload the head, reſolve catarrhs, and make a free reſpiration; for the ſubtile parts of the tobacco in inſpiration, are carried into the trachea and lungs, where they looſen the peccant humours adhering thereto, and promote expectoration. Some have left this tobacco in their noſes all night; but this is found to occaſion vomiting the next morning. Another thing charged on this way of application, is, that it weakens the ſight. When taken in great quantities in the way of ſnuff, it is found to prejudice the ſmelling, greatly diminiſhes the appetite, and in time gives riſe to a phthiſis. That taken in the way of ſmoak, dries and damages the brain. Borrhi, in a letter to Bartholine, mentions a perſon who through exceſs of ſmoaking, had dried his brain to that degree, that

his death there was nothing found in his ſkull but a little black lump, conſiſting of mere membranes.

Some people uſe the infuſion of tobacco as an emetic; but it is a very dangerous and unjuſtifiable practice, and often produces violent vomitings, ſickneſs and ſtupidity.

Bates and Fuller give ſome receipts, in which tobacco is an ingredient, with mighty encomiums in aſthmatic caſes. A ſtrong decoction of tobacco, with proper carminatives and cathartics, given clyſter-wiſe, ſometimes proves of good effect in what is uſually called the ſtone-cholic, and alſo in the iliac paſſion. A drop or two of the chymical oil of tobacco, being put on the tongue of a cat, produces violent convulſions, and death itſelf in the ſpace of a minute; yet the ſame oil uſed in lint, and applied to the teeth, has been of ſervice in the tooth-ach: though it muſt be to thoſe that have been uſed to the taking of tobacco, otherwiſe great ſickneſs, retchings, vomitings, *&c.* happen; and even in no caſe is the internal uſe of it warranted by ordinary practice.

A ſtrong decoction of the ſtalks, with ſharp-pointed dock and alum, is ſaid to be of good ſervice, uſed externally, in cutaneous diſtempers, eſpecially the itch; ſome boil them for that purpoſe in urine. The ſame is ſaid to be infallible in curing the mange in dogs.

Beat into a maſh with vinegar, or brandy, it has been found ſerviceable for removing hard tumours of the hypochondria.

Tobacco makes a conſiderable article of commerce; that imported from the britiſh plantations, pays a duty of 5 $\frac{1}{3}$ d. the pound, which is wholly drawn back on exportation: alſo, if all the duties are paid down at entry, 25 per cent. is allowed in lieu of all former encouragements; or the importer may pay down the old ſubſidy, which is $\frac{3}{4}$ of a penny per pound, and give bond for the payment of the remaining duties in eighteen months, and only have an allowance of 15 per cent. out of the bondable duties: ſo that the duties upon a pound of britiſh plantation tobacco, when the bondable duties are ſecured as above, amount to 6 $\frac{13\frac{3}{4}}{100}$ d. which is drawn back on exportation. But if the importer ſhall be deſirous to diſcharge his bond, or any part thereof, before the expiration of eighteen months, he ſhall be abated upon ſuch bond ſo much as the diſcount at the rate of 7 per cent. per annum ſhall amount to, in proportion to the time unexpired. No tobacco can be imported into the kingdom of Great Britain, otherwiſe than in caſks, cheſts, or caſes; each caſk, cheſt, or caſe, containing 450 lb. weight of neat tobacco at leaſt, under the penalty of the forfeiture of all ſuch tobacco. Alſo no tobacco unmanufactured ſhall be exported but in caſks, cheſts, or caſes of 425 lb. weight, or more, of neat tobacco, except what is exported by way of ſamples: and all tobacco muſt be ſhipped from the very ſame port or place, in the original package, and with the ſame marks, as it was firſt imported, without any alteration, except neceſſary cooperage, under the penalty of the forfeiture of all ſuch tobacco. By an act paſſed in the twenty fourth year of his late majeſty George II. no tobacco ſhall be manufactured till an account is given to the chief officer of the cuſtoms at the port of importation, of the mark and quantity of the caſk ſo delivered to be manufactured; and if ſuch an account ſhall not be given in, or is found to be fraudulent, the importer ſhall forfeit 30l. for every hogſhead, *&c.* And by the ſame act, no tobacco, or tobacco ſtalks, exceeding 24 lb. nor any ſnuff, exceeding 10 lb. ſhall be conveyed by land from the place of importation, without a certificate firſt obtained from the chief cuſtom-houſe officers in that port, together with the importer's oath thereto, that the duties were paid or ſecured at the importation, *&c.* on pain of forfeiting the tobacco and ſnuff; as alſo the carriage and horſes, and the carrier to be impriſoned for one month: and if any perſon ſhall counterfeit or alter ſuch certificate, or procure the ſame to be done, he ſhall forfeit 50 l. for every ſuch offence. Alſo, if any tobacco be conveyed by water, without being duly entered at the cuſtom-houſe, and a certificate as above obtained, it ſhall be forfeited, and the maſter of the veſſel ſhall alſo forfeit 6 d. per pound. The penalty for counterfeiting ſuch a certificate is 100 l. What has been ſaid of conveying tobacco from the place of importation, holds equally of conveying it from any other place, without a certificate as above.

Tobacco muſt not be cultivated in England,

ſand, except in phyſic gardens, on forfeiture of 40 s. for every rood of ground planted with it. Alſo, if any perſons cut the leaves of walnut-tree, ſo as to reſemble thoſe of tobacco, and ſell the ſame mixed therewith, they ſhall forfeit 5 s. per pound.

TOBAGO, a ſmall iſland in the bay of Panama, in South America, ſituated weſt long. 82°, north lat. 8°.

TOBAGO, or TABAGO, is alſo the name of one of the Caribee-Iſlands. See the article TABAGO.

TOBOLSKI, the capital of Siberia, ſituated at the confluence of the rivers Tobal and Irtis: eaſt longitude 63°, north latitude 57° 30′.

TOCAT, the capital of Amaſia, in Aſia: eaſt long. 37°, and north lat. 41° 30′.

TOCKAY, a city of Hungary, ſeventy miles north eaſt of Buda, the wines of which are eſteemed the beſt in Europe.

TOD *of wool*, a quantity containing twenty-eight pounds, or two ſtone. See the articles WOOL and WEIGHT.

TODI, a town of Italy, ſituated on the river Tiber, fifty miles north of Rome.

TOES, called by anatomiſts *digiti pedis*, are the extreme diviſions of the feet, anſwering to the fingers of the hands. See the articles FOOT and HAND.

The bones of the toes of both feet are twenty-ſix in number, ſometimes twenty-eight; being much ſlenderer, except that of the great toe, than thoſe of the fingers: they have alſo a much leſs free motion than thoſe of the fingers: the great toe has only two bones, and the reſt three; except the little toe in very old people, in whom the two extreme phalanges of the little toe grow together ſo as to form only one bone; whence we find, in this caſe, fewer bones in each foot than thirteen.

For the ſeſamoide bones of the toes, ſee the article SESAMOIDE.

In caſe of adheſions of the toes of infants, they ſhould be ſeparated either by cutting out the intermediate ſkin with a pair of ſciſſars, or barely by dividing them with the ſame inſtrument: and when this is done, in order to prevent their cohering again, they ſhould be wrapped up in a ſpiral bandage, dipped in lime-water and ſpirit of wine.

TOFT, in law-books, denotes a parcel of land, or a place where a meſſuage has formerly ſtood.

TOGA, in roman antiquity, a wide woollen gown, or mantle; which ſeems to have been of a ſemi-circular form, without ſleeves; differing both in richneſs and largeneſs, according to the circumſtances of the wearer, and uſed only upon occaſion of appearing in public.

Every body knows that the toga was the diſtinguiſhing mark of a Roman: hence, the jus togæ, or privilege of the toga, was the ſame with the privilege of a roman citizen; *i. e.* the right of wearing a roman habit, and of taking, as they explain it, fire and water through the roman empire.

TOILS, ſnares or nets uſed by hunters for catching wild beaſts, as deer, *&c.*

TOILET, a fine cloth of linen, ſilk, or tapeſtry, ſpread over the table in a bed-chamber or dreſſing-room, to undreſs and dreſs upon.

TOISE, a french meaſure containing ſix of their feet, or a fathom. See FOOT.

TOISON D'OR, a term, in heraldry, for a golden fleece, which is ſometimes borne in a coat of arms.

TOLEDO, a city of New Caſtile, in Spain; the archbiſhop of which is primate of Spain, *&c.* and poſſeſſes the largeſt revenue of any archbiſhop in Europe: it is ſituated in weſt longitude 4° 12′, and north latitude 39° 45′.

TOLEN, the capital of an iſland of the ſame name, in the province of Zealand, in the United Netherlands, ſituated four miles north-weſt of Bergenopzoom.

TOLENTINO, a town of the marquiſate of Anconia, in Italy, twenty-four miles ſouth-weſt of Loretto.

TOLERATION, in matters of religion, is either civil or eccleſiaſtical. Civil toleration, is an impunity and ſafety granted by the ſtate to every ſect that does not maintain doctrines inconſiſtent with the public peace: and eccleſiaſtical toleration, is the allowance which the church grants to its members to differ in certain opinions, not reputed fundamentals.

The term toleration has made a great figure in the diſputes among proteſtants, who have been exceedingly divided about the meaſures of toleration, or the degrees to which heretics and ſchiſmatics are, or are not to be ſuffered.

TOLESBURG, a port-town of Livonia: eaſt long. 26°, north lat. 59°.

TOLHUYS, a town of Guelderland, in the United Netherlands, ſituated on the Rhine, nine miles eaſt of Nimeguen.

TOLK, in ornithology, the back, brown, and white mottled tringa. See the article TRINGA.

TOLL, in law, denotes a tax or cuftom paid for paffage, or for the liberty of felling goods in a market or fair. Hence, toll booth is a place in a town, where goods are weighed, in order to afcertain the duties thereon.

TOLLENON, among the Romans, a warlike machine, formed in this manner: one beam was fixed very deep in the earth, and on the top of it another, more than twice as long, and moveable upon a center; on one end of this crofs-beam were placed a covering of hurdles or planks, within which a few foldiers were put, and by pulling down the other end with ropes, thefe were raifed above the walls of a befieged town.

TOLMEZZO, a town of Friuli in Italy: eaft long. 13°, north lat. 47°.

TOLNA, a town of Lower Hungary, fixty miles fouth of Buda.

TOLOSA, a city of Bifcay, in Spain: weft long. 2°, and north lat. 43° 30′.

TOLU, a port-town of Terra Firma, fituated on a bay of the North Sea, an hundred miles fouth weft of Carthagena.

TOLUIFERA, in botany, a genus of the decandria-monogynia clafs of plants, the flower of which is compofed of five petals, which are inferted into the cup; four of thefe are ftrait and equal in fize, and are a little longer than the cup; but the fifth is twice as large as thefe, and is cordated at the end, and has an unguis of the length of the cup. The fruit and feeds are yet unknown. It is fo called, from its producing the balfam of peru. See the article BALSAM.

TOMAN, or TOUMAN, a kind of imaginary money ufed among the Perfians in the keeping of their books, and to facilitate the reduction of money in the payment of confiderable fums. See the article MONEY.

TOMB, includes both the grave or fepulchre wherein a defunct is interred, and the monument erected to preferve his memory. See MONUMENT.

TOMBEC, a town of Brabant, ten miles eaft of Bruffels.

TOME, in matters of literature, denotes a bound book, or writing that juft makes a volume. See BOOK and VOLUME.

TOMENTUM, among botanifts, the downy matter which grows on the leaves of fome plants.

TOMEUT, a town of Nigritia, in Africa: weft long. 11°, north lat. 14°.

TONDEREN, or TUNDER, a town of South Jutland, fituated on a bay of the German fea, twenty miles fouth of Rypen.

TONE, or TUNE, in mufic, a property of found, whereby it comes under the relation of grave and acute; or it is the degree of elevation any found has, from the degree of fwiftnefs of the vibrations of the parts of fonorous bodies. See the article SOUND and TUNE.

Tone is more particularly ufed for a certain degree or interval of tune, whereby a found may be either raifed or lowered from one extreme of a concord to the other, fo as ftill to produce true melody. See INTERVAL and CONCORD.

TONGEREN, or TONGERS, a town of the bifhopric of Liege, in Germany, ten miles north weft of Liege.

TONGUE, *lingua*, in anatomy, the primary organ of tafte and fpeech; the figure of which approaches, in fome degree, to pyramidal; its anterior part being called apex, and its pofterior part the bafe or root. The upper fide is not quite flat, but a little convex, and divided into two lateral halves, by a fhallow depreffed line called linea linguæ mediana. The edges are thinner than the other parts, and a little rounded as well as the point. The lower fide reaches only from the middle of the length of the tongue to the point.

The tongue is principally compofed of very foft flefhy fibres, intermixed with a peculiar medullary fubftance, and difpofed in various manners. Many of thefe fibres are confined to the tongue without going any farther; the reft form feparate mufcles which go out from it in different ways, and are inferted in other parts: all the upper fide of the tongue is covered by a thick membrane of a papillary texture, upon which lies another very fine membrane like a kind of epidermis, which is likewife continued over the loweft fide, but without papillæ.

Three forts of papillæ may be diftinguifhed in the upper fide of the tongue, capitatæ, femi-lenticularis, and villofæ. Thofe of the firft kind are the largeft, refembling little mufhrooms with fhort ftems, or buttons without a neck: they lie on the bafis of the tongue, in fmall fuperficial foffulæ. They refemble fmall conglomerate glands feated on a very narrow bafis, and each of them has fometimes a fmall depreffion in the middle of their upper convex fide: they occupy the whole furface of the bafis of the tongue, and are fituated near each other,

other, in ſuch a manner as that the moſt anterior form an angle; they are glandular papillæ, or ſmall ſalival or mucilaginous glands, of the ſame kind with thoſe that are to be deſcribed hereafter.

We often obſerve, about the middle of this part of the tongue, a particular hole of different depths; the inner ſurface of which is entirely glandular, and filled with ſmall papillæ like thoſe of the firſt kind. It is called foramen cæcum Morgagnii, as being firſt deſcribed by that author; ſince that time Vaterus has diſcovered a kind of ſalival ducts belonging to it; and Heiſter found two of theſe ducts very diſtinctly, the orifices of which were in the bottom of the foramen cæcum, near each other. He obſerved the ducts to run backward, divaricating a little from each other; and that one of them terminated in a ſmall oblong veſicle, ſituated on the ſide of the ſmall cornu of the os hyoides.

The papillæ of the ſecond kind, or ſemilenticulares, are ſmall orbicular eminences, only a little convex, their circular edge not being ſeparate from the ſurface of the tongue. When we examine them in a ſound tongue with a good microſcope, we find their convex ſides full of ſmall holes or pores, like the end of a thimble.

They lie chiefly in the middle and anterior portions of the tongue, and are ſometimes moſt viſible on the edges, where they appear to be very ſmooth, and poliſhed even to the naked eye, and ſometimes in living ſubjects. They ſoon loſe their conſiſtence after death, ſo that, by rubbing them ſeveral times, they may be drawn out in form of ſmall ſoft pyramids, inclined to one ſide. The papillæ of the third kind, or villoſæ, are the ſmalleſt and moſt numerous. They fill the whole ſurface of the upper ſide of the tongue, and even the interſtices between the other papillæ. They would be more properly named papillæ conicæ, than villoſæ, from the figure which they appear to have, when examined through a microſcope in clear water. They are naturally ſoftiſh, but become extremely flaccid after death; ſo that by handling them they may be made ſhort and thick, whereas they are naturally long and ſmall.

The fleſhy fibres of which the tongue is compoſed, and which go no further than the tongue, may be termed muſculi linguæ interiores, or the intrinſic muſcles; and they are the ſame with what Spigelius named muſculi linguales. The fibres theſe muſcles conſiſt of are of three general kinds, longitudinal, tranſverſe, and vertical; and each of theſe ſituations admits of different degrees of obliquity. The longitudinal fibres point to the baſis and apex of the tongue, and ſeem partly to be expanſions of the muſculi ſtylogloſſi, hyo-gloſſi, and genio-gloſſi. The vertical fibres ſeem likewiſe to be in part produced by the ſame genio-gloſſi, and the tranſverſe by the mylo gloſſi.

Beſides theſe mixed productions, there is a diſtinct plane of longitudinal fibres, which run near the ſurface of the upper ſide of the tongue, and a diſtinct tranſverſe plain under them. All theſe fibres are partly interwoven, one portion of them terminating at the two edges of the tongue, and the other at the baſis and point, without going to any other part; and they lie immediately above thoſe which belong to the genio-gloſſi. To diſcover all theſe different fibres, and their different degrees of direction, we need only cut the tongue longitudinally, after it has been boiled, or long macerated in ſtrong vinegar. The extrinſic muſcles, or muſculi exteriores, are thoſe which by one extremity make a part of the body of the tongue, and are fixed by the other in ſome part without the tongue. Of theſe we reckon four pair, mylo-gloſſi, ſtylo-gloſſi, hyo-gloſſi, and genio-gloſſi.

In plate CCLXXIX. fig. 5. n°. 1. is repreſented the human tongue, with its three integuments, which anatomiſts in general have omitted to remark. Bourdon, indeed, has figured them, but thicker than the life. A A A is the upper ſurperficies of the tongue, on which are viſible a multitude of papillary and pyramidal eminences. B is a piece of the exterior tunic, or coat of the tongue; in which are diſcernable a vaſt number of nervous papillæ, adhering to its interior ſurface. C C is the ſecond tunic, called the corpus reticulare of Malpighi. D is the corpus reticulare of other writers. E is the membrane, or corpus papillare nervoſum. F F the glands of the tongue; and G the foramen uſually found in the hinder part of the tongue.

N° 2. *ibid.* exhibits a human tongue, in which Heiſter diſcovered two remarkable ſalival ducts, *b* and *d*, in the foramen cæcum A; *c c* is a veſicle at the extremity of the duct *d*, diſtended with ſaliva; and *e* is the place where this duct diſappeared:

peared: *ff* ſhew the courſe and ſituation of theſe ducts. The fabric and ſtructure of the oſcula, expreſſed at *b* and *d*, was ſingular; having the appearance of valves or caruncles, that had collapſed, ſo that they did not appear as repreſented in the figure, unleſs forced open by inflation: *h* is the epiglottis, *i* its anterior ligament, *k* muſcular fibres ariſing from the ſubſtance of the tongue, *l l* two little oſſicles of the os hyoides, *m m* the extremities of the horns of the os hyoides, *n n* glands and papillæ of various ſize, about the middle of the tongue; and *o* the apex of the tongue bent downwards.

TONGUE-TIED, the popular name for a diſtemper of the tongue in children, when it is tied down too cloſe to the bottom of the mouth, by a ligament connected all along its middle, and called its frænulum, which requires to be divided, to give the tongue its proper motion. See the article FRÆNUM.

This is ſometimes the caſe in adults, but oftener in children, who cannot then exert their tongues to ſuck. This is, however, by no means ſo common as the women uſually imagine; not ſo much as one child in a thouſand being afflicted with it; nor is the operation in cutting it of little conſequence, ſince often bad accidents follow it, and ſometimes the loſs of the child's life. When the infant can put its tongue out of its mouth, the frænulum wants no inciſion; but when the tongue cannot be extended beyond the teeth, the operation is neceſſary. To perform this, the end of the tongue ſhould be covered with a linen rag, and held with the fingers to prevent its ſlipping, and the ligament of the tongue running between the ranular veins and internal ſalival ducts, is to be divided by a pair of obtuſe-pointed ſciſſars, till it give room enough for ſucking or ſpeaking: but in doing this, great care muſt be taken not to wound the ſalival ducts, or the proper veins and arteries of the tongue; for children have been known to periſh upon the ſpot, from the cutting the ranular veins in this operation. Midwives often tear this ligament with their fingers, as ſoon as the child is born; but this is a dangerous and bad practice.

TONIC, τονικ☉, in medicine, is applied to a certain motion of the muſcles wherein the fibres, being extended, continue their extenſions in ſuch a manner, as that the part ſeems immoveable, though in reality it be in motion.

TONNAGE, or TUNNAGE. See the article TUNNAGE.

TONNINGEN, a port-town of ſouth Jutland, ſituated at the mouth of the Eyder, in eaſt long. 8° 40′, north lat. 54° 40′.

TONQUIN, a kingdom of the further India, bounded by the provinces of Yunam and Canton, in China, on the north; by Cochin China, on the ſouth; and by the kingdom of Laos, on the weſt; lying between 101° and 108° eaſt long. and between 17° and 26° north lat. Its capital is Keccio, or Cachao.

TONSBURG, a port-town of Norway, in the province of Aygerhuys, ſituated on the Scaggerack-ſea, thirty miles weſt of Frederickſtat.

TONSILS, *tonſillæ*, in anatomy, two remarkable glands, ſituated one on each ſide of the mouth, near the uvula, and commonly called almonds of the ears, from their reſembling almonds in figure. Their uſe is to ſecrete a mucous humour for lubricating the paſſages: this they diſcharge by ſeveral irregular but conſpicuous foraminæ into the mouth.

The tonſils are apt to be inflamed from taking cold, for which Heiſter firſt adviſes a gentle purge of tamarinds, ſena, and cream of tartar; and this to be repeated to the third or fourth doſe, if there be occaſion: in the intermediate times, the diaphoretic attemperating and nitrous medicines are to be given in powders, and a large quantity of diluting liquors allowed, which ſhould be gently acidulated, and have a ſmall quantity of nitre diſſolved in them: gargariſms made of decoctions of biſtort-root, red-roſes, and other gentle aſtringents, are alſo to be frequently uſed; and the frequent waſhing the feet in warm water, often has a very remarkable good effect.

If after four or five days the diſtemper is found not to give way to theſe means, but the tumour ſtill remains, there is then but little hopes to be had of its reſolution, and a very different end is to be attempted: emollient gargariſms are now to be uſed, and maturating plaſters externally applied, ſuch as diachylon with the gums, and the like; and ſuppurating cataplaſms are to be applied to the whole neck and throat: theſe methods are to be continued till the tumour either burſts of itſelf, or is ſo ripe as to be fit for opening by the hand of the ſurgeon. After this has been done, and the matter is diſcharged, gargariſms muſt be uſed of decoctions of ſome vulnerary herb; or common green tea,

tea, ſweetened with honey of roſes, may be uſed to ſerve the purpoſe. The mouth and throat are to be frequently waſhed with this till the part is healed. It is to be obſerved, however, that the reſolution of theſe tumours is never to be deſpaired of, not even during the uſe of the ſuppurating medicines, for it is often ſeen that the tumour has been wholly diſcuſſed even during the uſe of theſe means, the reſolution often being extremely ſlow.

This is a very troubleſome complaint, and with ſome perſons is apt to return very frequently; the beſt preſervative againſt it is a moderate diet and bleeding, about the time of the equinoxes, either in the arm or foot. Some have found it neceſſary to open an iſſue in the arm, in this caſe, and have been by this means perfectly cured; but on its drying up have always found the diſeaſe return.

TONSURE, in eccleſiaſtical hiſtory, a particular manner of ſhaving or clipping the hair of eccleſiaſtics or monks.

The antient tonſure of the clergy was nothing more than polling the head, and cutting the hair to a moderate degree, for the ſake of decency and gravity: and the ſame obſervation is true, with reſpect to the tonſure of the antient monks. But the romaniſts have carried the affair of tonſure much farther; the candidate for it kneeling before the biſhop, who cuts his hair in five different parts of the head, *viz.* before, behind, on each ſide, and on the crown.

TOOL, among mechanics, denotes in general any ſmall inſtrument, uſed as well for making other more complex inſtruments and machines, as in moſt operations in the mechanic arts. See the article INSTRUMENT.

The tools of joiners, ſmiths, &c. may be ſeen delineated and deſcribed under the articles JOINERY, SMITHERY, &c.

TOOTH, *dens*, in anatomy, a little, very hard, and ſmooth bone, fixed in a proper alveolus or ſocket in the jaw, in the manner of a nail; and ſerving to maſticate or chew the food. See the articles FOOD, CHYLE, and CHYLIFICATION.

The natural colour of the teeth, in mankind, is white; and their number from twenty-eight to thirty-two; fourteen, fifteen, or ſixteen being placed in each jaw, if the number be perfect. The teeth are uſually divided into the four inciſores, or fore-teeth; the two canine, eye-teeth, or dog teeth; the eight molares, or grinders, in each jaw, and two dentes ſapientiæ.

The bodies of the teeth are compoſed of a double ſubſtance, a ſtony or porcelain-like matter, and a medullary one: their roots are ſometimes ſimple, as in the inciſores, canini, and foremoſt of the molares; and ſometimes double, triple, or quadruple, as in the hinder molares. The cavities of the teeth are covered with a vaſculo-nervous membrane, and the foraminula, or little holes, in the ends of them, ſerve for the ingreſs of the veſſels which afford them nutrition and ſenſation.

The uſes of the teeth are to break our food, to aſſiſt us in ſpeaking, and to add to the beauty of the face.

For the breeding of the teeth, in infants, ſee the article DENTITION.

Foſſile teeth of fiſhes are known by three names; the gloſſo-petræ, the bufonitæ, and the plectronitæ. See the articles GLOSSOPETRÆ, &c.

As to the cleanſing of foul teeth, ſee the article DENTIFRICE.

TOOTH-ACH, ὀδονταλγια, a very painful diſorder, cauſed by an impure ſerum which corrodes and rends the ligaments and nervo-glandulous coats, by which the teeth are kept firm in their ſockets: its ſeat may alſo be in the cavity or internal parts of the teeth themſelves.

The whole intention of cure, in this diſorder, conſiſts in deriving and diverting the impure ſcorbutic ſerum from the head, and then carrying it off by proper emunctories. This is to be done by ſaline, emollient, and purgative clyſters; by warm pediluvia of rain-water and wheat-bran, with venice-ſoap, uſed juſt before bed-time; by laxatives of manna and caſſia diſſolved in whey or aſſes-milk, or mineral waters: if the patient is plethoric or full of blood, phlebotomy in the foot will be proper, to derive the humours from the head. Sudorific remedies are alſo proper, but more eſpecially an electuary made of rob of elder-berries, burnt hart's horn, diaphoretic antimony, and a few grains of nitre: or, an ounce of the rob may be taken in broth, to promote a diaphoreſis; and it may be uſed externally, diſſolved in beer, in the manner of a gargle, which will yield immediate relief to the patient.

When the patient is ſubject to catarrhs, is ſcorbutic or cachectic, then mineral waters are moſt proper; and if the patient

tient is of a weak bilious conftitution, the water fhould be mixed with affes-milk. Outwardly may be applied bags, filled with paregoric and emollient fpecies; fuch as elder, melilot, and camomile-flowers, bay and juniper-berries, caraway and millet-feeds, and decrepitated falt: they muft be laid on warm, and are very fafe. A drop or two of oil of cloves or box, applied to a carious tooth with cotton, are medicines not to be defpifed; and camphorated fpirits of wine, mixed with faffron, caftor, and opium made into a liniment, and laid to the gums and hollow tooth, often gives the patient eafe. When the tooch-ach proceeds from a rotten, hollow tooth, it will be beft to burn the little nervous cord, which is the feat of the pain, with an acute cautery; and then the cavity may be filled up with a mixture of wax and maftich. But if this cannot be done, the only remedy left is to have the tooth drawn.

Allen advifes to rub the tooth, that is painful, with the root of the iris lutea, or the yellow fleur-de-luce; or a pill may be made of equal quantities of camphor or opium, and put into the hollow tooth; and, laftly, fome greatly recommend a fmall plafter of tacamalhac, laid on the fide of the face.

TOOTH-DRAWING, the operation of pulling out a carious, or otherwife injured tooth.

This art, according to Cicero, was invented by Æfculapius, in whofe temple the antients hung up a pair of leaden pullicans, very properly fignifying that no teeth were fit to be pulled out, but fuch as might be removed with a leaden forceps; that is, fuch as were loofe and ready to fall out of themfelves; for they very little confult their own welfare, who pull out their teeth while firm and found: for drawing the teeth is not only a painful operation, but often brings on bad accidents, and fometimes even hazards the patient's life.

Tooth drawing, however wrong in many cafes, yet is certainly right and neceffary in others. 1. In children, for the removing their lacteal, or deciduous teeth; for when thefe are left too long in their fockets, they difplace the new ones, and turn them awry. 2. In infants it is alfo neceffary to draw fuch teeth as grow out of the palate, or out of improper parts of the mouth, and are placed fo as to impede their fpeaking or fucking. 3. In the tooth-ach proceeding from a tooth's being carious, and giving way to no medicines, drawing is the laft refort, and is abfolutely neceffary. 4. Thofe teeth ought to be drawn which by their irregular figure and pofition lacerate the gums and lips, and cannot be brought into fhape by the file. And, laftly, it is fometimes neceffary to draw a tooth for the curing a fiftula, or ulceration of the gums near the roots of the teeth.

The regular method of drawing them is this: if the tooth is in the lower jaw, the patient muft be feated on a low feat, or on the floor, and if in the upper jaw, he muft be placed on a high ftool or table; then the proper inftrument is to be felected, and the tooth carefully drawn as a nail out of a piece of wood. But this muft never be done while the gums are inflamed, fwelled, or otherwife diftempered.

TOPARCHY, a little ftate or feigniory, confifting only of a few cities or towns; or a petty country, governed and poffeffed by a toparch, or lord. See the article GOVERNMENT.

TOPAZ, in natural hiftory, a gem called by the antients chryfolite, as being of a gold-colour. See the article GEM.

The topaz, when perfect and free from blemifhes, is a very beautiful and valuable gem; it is, however, very rare in this ftate. It is of the number of thofe gems which are found only in the round or pebble form, there never having been yet feen a true and genuine topaz of a columnar figure, tho' the far greater part of what our jewellers call fuch, are in that form. The greateft part of the true topazes are no larger than grains of a coarfe feed; among thefe there are, however, fome met with of the fize of a pea, and fome much larger, though thofe are very rare. It is of a roundifh or oblong figure in its native or rough ftate, and ufually is flatted on one fide, and is generally of a bright and naturally polifhed furface, tolerably tranfparent. They are ever of a fine yellow colour; but they have this, like the other gems, in feveral different degrees; the fineft of all are of a true and perfect gold-colour, but there are fome much deeper, and others extremely pale, fo as to appear fcarce tinged. The oriental topaz is equal to the ruby in hardnefs, and is fecond only to the diamond in luftre. The topazes of the other parts of the world fall off greatly from this hardnefs, but the pureft of the genuine ones are confiderably harder than cryftal. The topaz, on being thrown into a char-

 co-

coal fire, entirely loses its colour, and when taken out, is a very fine colourless stone, undistinguishable from that known by the name of the white sapphire: upon the whole it appears, that the oriental coloured gems are all much alike in their matter, differing scarce at all, except in colour, and that when they are found either naturally colourless, or rendered so by art, it is not easy to distinguish one of them from the other.

The finest topazes in the world are found in the East-Indies, but they are very rare there of any great size: the great mogul, however, at this time, possesses one, which is said to weigh an hundred and fifty-seven carats, and to be worth more than twenty thousand pounds. The topazes of Peru come next, after these, in beauty and in value; the european are principally found in Silesia and Bohemia, and are generally full of cracks and flaws, and of a brownish yellow.

Besides all these degrees of value in the genuine topazes, our jewellers keep what they call a kind of them, inferior greatly to the true ones; all these are common hexangular crystals, coloured to a paler or deeper yellow in mines: these they cut into stones for rings, and sell under the name of topazes; and most of the stones we see under that name are such.

The antients have said much of the topaz's virtue: it is said to be a high cordial and sudorific, and to have been given also in hæmorrhages with great success. But whatever virtues it may possess, we are not to expect to find them in the stones our druggists now keep under the name of topazes, these being no other than fragments of a yellowish plated spar, common in lead mines, and impregnated more or less with that metal. The topaz itself seems to owe its colour to lead, but the quantity it contains of that is so very inconsiderable, that it can be of no effect in the body, and may very well be supposed to leave it in the state of crystal; which seems as much as we are to imagine really of any of the gems; but this spar, sold in the place of topaz, not only discovers that it holds a great deal of lead by its weight, but lead has actually been separated from it, in no less quantity than one fifth of its weight.

TOPE, in ichthyology, the squalus with the nostrils near the mouth, and small holes near the eyes. See SQUALUS.

TOPHUS, in medicine, denotes a chalky or stony concretion in any part of the body, as the bladder, kidneys, *&c.* but especially in the joints. See GOUT.

TOPIC, in rhetoric, denotes a probable argument, drawn from the several circumstances of a fact, *&c.* Hence the art of finding and managing such arguments, is called by the antients *topica*, τοπικη. See the article INVENTION.

TOPICS, or TOPICAL MEDICINES, are the same with external ones, or those applied outwardly to some diseased and painful part: such are plasters, cataplasms, unguents, *&c.* See the articles PLASTER, *&c.*

TOPOGRAPHY, a description or draught of some particular place, or small tract of land, as that of a city or town, manor or tenement, field, garden, house, castle, or the like; such as surveyors set out in their plots, or make draughts of, for the information and satisfaction of the proprietors.

TOPSHAM, a port-town of Devonshire, situated on the river Ex, about four miles south of Exeter.

TORBAY, a fine bay in the English channel, a little east of Dartmouth, where the prince of Orange, afterwards king William III. landed, on Nov. 5, 1688.

TORBOLE, a town of the bishopric of Trent, in Italy, fourteen miles south-west of the city of Trent.

TORCELLA, a port-town of Catalonia, in Spain, situated at the mouth of the river Ter, in east long. 2° 50′, and north lat. 42°.

TORCELLO, a town and island of Italy, seven miles north of the city of Venice.

TORCH, *tæda,* a luminary used in several church-ceremonies, funerals, *&c.* and more usually called flambeau. See the articles FLAMBEAU and TAPER.

TORCH THISTLE, *cereus*, or *cactus*, in botany. See the article CACTUS.

TORCULAR, in surgery, the same with the tournequet. See TOURNEQUET.

TORDESILLAS, a town of Spain, forty miles north-east of Salamanca.

TORDYLIUM, in botany, a genus of umbelliferous plants, belonging to the pentandria-digynia class: the general flower of which is uniform and radiated: the particular ones of the disc consist of five inflexo-cordated and equal petals; the fruit is roundish, compressed, and surrounded longitudinally with dentils; the seeds are two, roundish, and almost plane. This genus comprehends hedge-parsley, candy hart-wort, *&c.* the seeds of which last are accounted carminative, and alexipharmic,

pharmic, but are very little ufed in the prefent practice.

TORE, *torus*, in architecture, a large round moulding, ufed in the bafes of columns. See the article MOULDING.

TOREUMATOGRAPHY, a greek term, fignifying the knowledge or rather defcription of antient fculptures and baffo-relievos.

TOREUTICE, τορευτικη, that part of fculpture otherwife called turning. See the article TURNING.

TORGAW, a town of the dutchy of Saxony, fituated on the river Elbe, thirty-five miles north-weft of Drefden.

TORIES, or TORYS, in the hiftory of England, a faction or party, oppofed to the whigs. See the article WHIGS.

The tories are great ficklers for the prerogative of the crown, as the whigs are for the liberties and privileges of the people: though, in truth, the principles of the moderate people of both parties do not greatly differ.

TORMENTIL, *tormentilla*, in botany, a genus of the icofandria-pentagynia clafs of plants, with a rofaceous flower, confifting of four obverfely cordated, plane, and patent petals; the ftamina are fixteen fubulated filaments, about half the length of the cup; the feeds are eight in number, oblong, obtufely acuminated, and contained in the cup, which forms a kind of globofe capfule.

Tormentil-root has an auftere ftyptic tafte, accompanied with an aromatic flavour: it is one of the moft agreeable and efficacious vegetable aftringents: there are alfo a tincture and a diftilled water of it, the former of which poffeffes all the virtues of the fimple.

TORMES, a river of Spain, which runs from fouth-eaft to north-weft, through the province of Leon, paffes by Salamanca, and afterwards falls into the river Douro in Portugal.

TORMINA, GRIPES, in medicine. See the article COLIC.

TORNADO, or TURNADO, a fudden and vehement guft of wind from all points of the compafs, frequent on the coaft of Guinea. See the articles HURRICANE, WHIRLWIND, &c.

TORNAW, a town of Upper Hungary, fixty miles north-eaft of Buda.

TORNE, or TORNEA, the capital of Torne Lapmark, a province of Sweden, fituated at the mouth of the river Torne, at the bottom of the Bothnic gulph, upon a little ifland made by the river, four hundred miles north of Stockholm: eaft long. 22° 45′, north lat. 65° 45′.

TORNESOL, or TURNESOL. See the article TURNESOL.

TORO, a city of Leon, in Spain, fituated on the river Douro, thirty-five miles weft of Valladolid.

TORPEDO, the CRAMP or NUMB-FISH, in ichthyology, a fpecies of raja, the body of which is perfectly fmooth, and confiderably broad in proportion to its length; the roftrum or fnout is oblong and fubacute; the back is fomewhat gibbofe; the belly is flat, and the fides are terminated by broad fins; its colour on the back is a dufky greyifh, and the belly is white. See the article RAIA.

The moft fingular property of this fifh is, that, when out of the water, it affects the hand or other part that touches it, with a fenfation much like that which we call the cramp; the fhock is inftantaneous, and refembles that given by electricity, only that the effect lafts longer: this is all the fifh can do; but thofe who have related it, have raifed the effects almoft into miracles. Reaumur has given a long memoir, wherein he endeavours to account for this fingular phænomenon, which he refolves into the inftantaneous action of a vaft multitude of fmall mufcles on the furface of the body of the fifh: but there feems fomething more required, in order to the perfectly explaining fo odd an effect. See plate CCLXXIX. fig. 4.

TORQUATA, in zoology, a name given to the natrix, or water-fnake, from the remarkable ring it has about its neck. See the article NATRIX.

TORQUE, in heraldry, denotes a round roll of cloth, twifted and ftuffed: fuch is the bandage, frequently feen in armories, about the heads of Moors, &c. It is always of the two principal colours of the coat; and is accounted the leaft honourable decoration worn on the helmet, by way of creft.

TORREFACTION, in chemiftry, is the roafting or fcorching of a body by the fire, in order to difcharge a part either unneceffary or hurtful in another operation; as fulphur is thus difcharged from an ore, before the metal can be obtained to advantage. See ROASTING.

TORREJO, a town of New Caftile, in Spain, fifteen miles fouth of Madrid.

TORRENT, *torrens*, in geography, denotes a temporary ftream of water, falling

ing fuddenly from mountains, whereon there have been great rains, or an extraordinary thaw of fnow.

TORRES, a port-town of Granada, in Spain, forty-five miles fouth-weft of the city of Granada: weft long. 4° 26′, north lat. 36° 45′.

TORRICELLIAN EXPERIMENT, a famous experiment made by Torricelli, a difciple of the great Galileo, which has been already explained under the article BAROMETER.

TORRID ZONE, among geographers, denotes that tract of the earth lying upon the equator, and on each fide as far as the two tropics, or 23° 30′ of north and fouth lat. The torrid zone was believed, by the antients, to be uninhabitable; but is now well known to be not only inhabited by the natives of thofe hot climates, but even tolerable to the people of the colder climates towards the north and fouth; the exceffive heat of the day being there tempered by the coldnefs of the night. See the article HEAT.

TORRIGLIA, a town of the territory of Genoa, in Italy, fituated ten miles northweft of Genoa.

TORRINGTON, a market-town of Devonfhire, fituated on the river Towbridge, twenty fix miles north-weft of Exeter.

TORROCK, in ornithology, the larus with a white head, and a black fpot on each fide. See the article LARUS.

TORSIL, a town of Sweden, in the province of Sunderland, fituated on the Mellerlake, forty three miles weft of Stockholm.

TORT, in law, a French term, fignifying wrong or injury.

TORTOISE, *teftudo*, in zoology. See the article TESTUDO.

TORTONA, a city of Italy, in the dutchy of Milan, fituated on the fouth fide of the Po, thirty two miles fouth-weft of Milan.

TORTOSA, a city of Catalonia in Spain, fituated on the river Ebro, ninety miles fouth-weft of Barcelona: eaft long. 15′, and north lat. 40° 45′.

TORTUGA, an ifland of the Weft Indies near the north coaft of Hifpaniola.

TORTUGA is alfo an ifland on the coaft of Terra Firma.

TORTURE, a grievous pain inflicted on a criminal, or perfon accufed, to make him confefs the truth.

TOSA, a port-town of Catalonia, in Spain, thirty-feven miles north-eaft of Barcelona.

TOSCANELLA, a town of Italy, thirty-five miles north of Rome.

TOTANUS, or GODWIT, in ornithology, the red-legged tringa, with a black beak, red at the bafe. See TRINGA.

TOTNESS, a borough-town of Devonfhire, twenty-three miles fouth-weft of Exeter. It fends two members to parliament.

TOTTED. A good debt to the king is, by the foreign oppofer, or other officer of the exchequer, noted for fuch by writing the word *tot*, *q. d. tot pecuniæ regi debentur*; whence it is faid to be totted. Alfo that which is paid is to be totted.

TOUCAN, in ornithology, a fpecies of ramphaftos, of a middle fize between our common magpie and the thrufh, but having a beak thicker and longer than its whole body: this beak is hooked at the end, and is of a very thin fubftance, not exceeding the thicknefs of a membrane, and very light and hollow, yet bony in fubftance, and very bright and fhining. It has a fort of toothed edge, which prevents its fhutting clofely, and, giving paffage for the air, enables the bird to live without noftrils. It is yellowifh on the outfide and red within, and is covered with a fort of fcaly fubftance, eafily fcraped off with a finger at the edge.

The head of this bird is large in proportion to its body, and is black on the crown; the reft of it, and the neck and back, are flightly variegated with white; its breaft is of a bright orange colour, its belly and thighs of a very fine and bright red, and the tail is black but red at the end. See plate CCLXXXI. fig. 3.

TOUCAN, in aftronomy, a conftellation of the fouthern hemifphere, confifting of eight fmall ftars, and otherwife called anfer americanus.

TOUCH-NEEDLE, among affayers, refiners, &c. little bars of gold, filver, and copper, combined together in all the different proportions and degrees of mixture; the ufe of which is to difcover the degree of purity of any piece of gold or filver, by comparing the mark it leaves on the touch-ftone, with thofe of the bars.

The metals ufually tried by the touchftone, are gold, filver, and copper, either pure, or mixed with one another in different degrees and proportions, by fufion. In order to find out the purity or quantity of bafer metal in thefe various admixtures, when they are to be examined, they are compared with thefe needles, which are mixed in a known proportion, and prepared for this ufe. The metals of thefe needles, both pure and mixed, are all made into laminæ or plates, one

twelfth

twelfth of an inch broad, and of a fourth part of their breadth in thicknefs, and an inch and half long; thefe being thus prepared, you are to engrave on each a mark indicating its purity, or the nature and quantity of the admixture in it.

The black rough marbles, the bafaltes, or the fofter kinds of black pebbles, are the moft proper for touch-ftones. See MARBLE, BASALTES, &c.

Now the method of ufing the needles and ftone is this: the piece of metal to be tried, ought firft to be wiped well with a clean towel, or piece of foft leather, that you may the better fee its true colour; for from this alone an experienced perfon will, in fome degree, judge before-hand what the principal metal is, and how, and with what debafed.

Then chufe a convenient not over large part of the furface of the metal, and rub it feveral times very hardly and ftrongly againft the touch-ftone, that in cafe a deceitful coat or cruft fhould have been laid upon it, it may be worn off by that friction: this, however, is more readily done by a grind-ftone, or fmall file, if you have them at hand. Then wipe a flat and very clean part of the touchftone, and rub againft it, over and over, the juft mentioned part of the furface of the piece of metal, till you have, on the flat furface of the ftone, a thin metallic cruft, an inch long, and about an eighth of an inch broad: this done, look out the needle that feems moft like to the metal under trial, wipe the lower part of this needle very clean, and then rub it againft the touch-ftone, as you did the metal, by the fide of the other line, and in a direction parallel to it. When this is done, if you find no difference between the colours of the two marks, made by your needle and the metal under trial, you may with great probability pronounce that metal and your needle to be of the fame alloy, which is immediately known by the mark engraved on your needle. But if you find a difference between the colour of the mark given by the metal, and that by the needle you have tried, choofe out another needle, either of a darker or lighter colour than the former, as the difference of the tinge on the touch-ftone directs; and by one or more trials of this kind you will be able to determine which of your needles the metal anfwers, and thence what alloy it is of, by the mark of the needle; or elfe you will find that the alloy is extraordinary, and not to be determined by the comparifon of your needles.

TOUL, a city of Lorrain, twelve miles weft of Nancy.

TOULON. } See { THOULON.
TOULOSE. } See { THOULOSE.

TOUR, a french term, frequently ufed for a journey or progrefs through one or more countries.

TOURN, or TURN, in law. See the article TURN.

TOURNAMENT, or TURNAMENT. See the article TURNAMENT.

TOURINE, a town of the bifhopric of Liege, thirteen miles north-eaft of Namur.

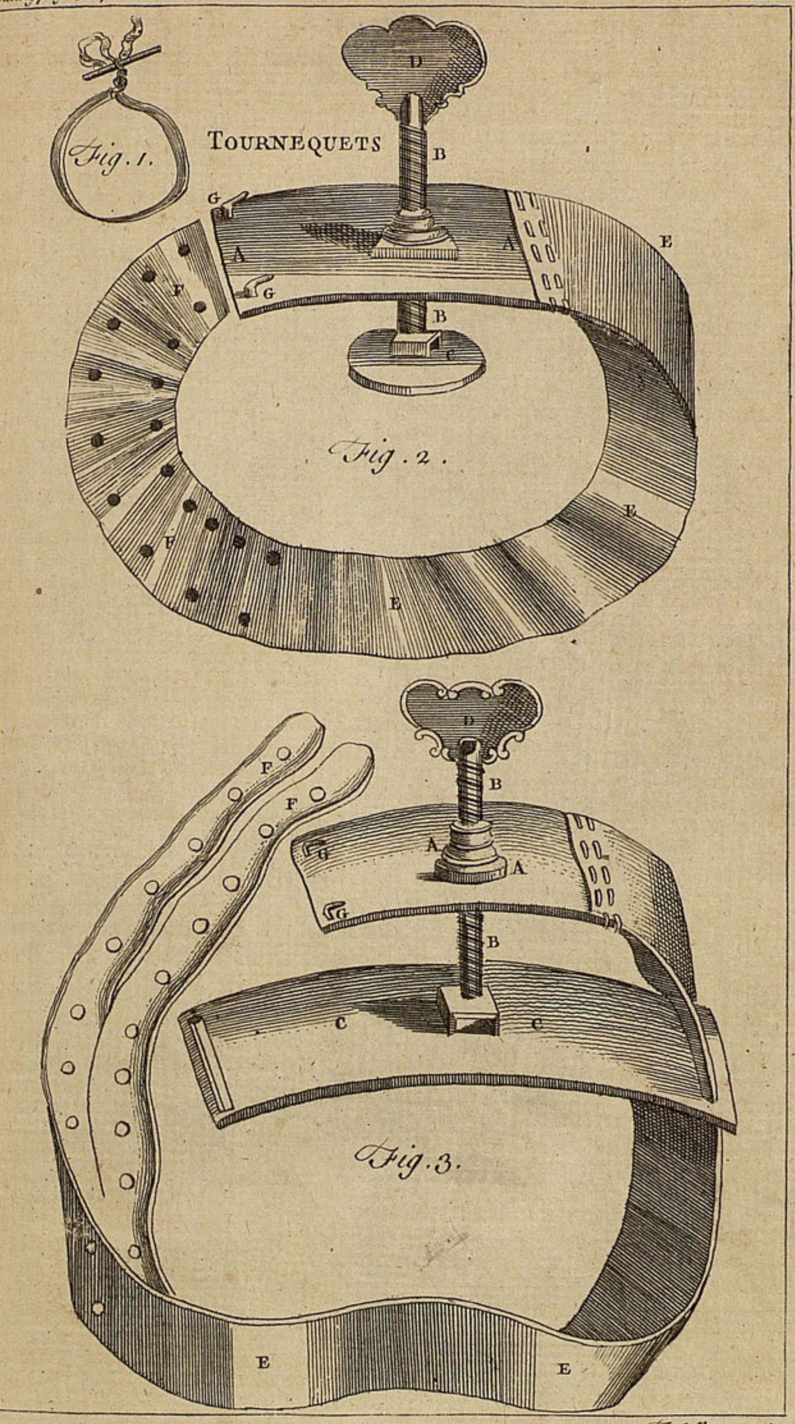
TOURNAY, a city of Flanders, in the auftrian Netherlands, fituated on the river Scheld, thirteen miles eaft of Lifle: eaft long. 3° 30′, and north lat. 50° 37′.

TOURNEFORTIA, in botany, a genus of the pentandria-monogynia clafs of plants, the flower of which confifts of a fingle petal, in form of an oval tube, longer than the calyx, divided into five flight fegments fomewhat broad and pointed, and fpread open; the fruit is a globofe berry, containing two cells; and the feeds are of an oval figure, two in number, and feparated by the pulp.

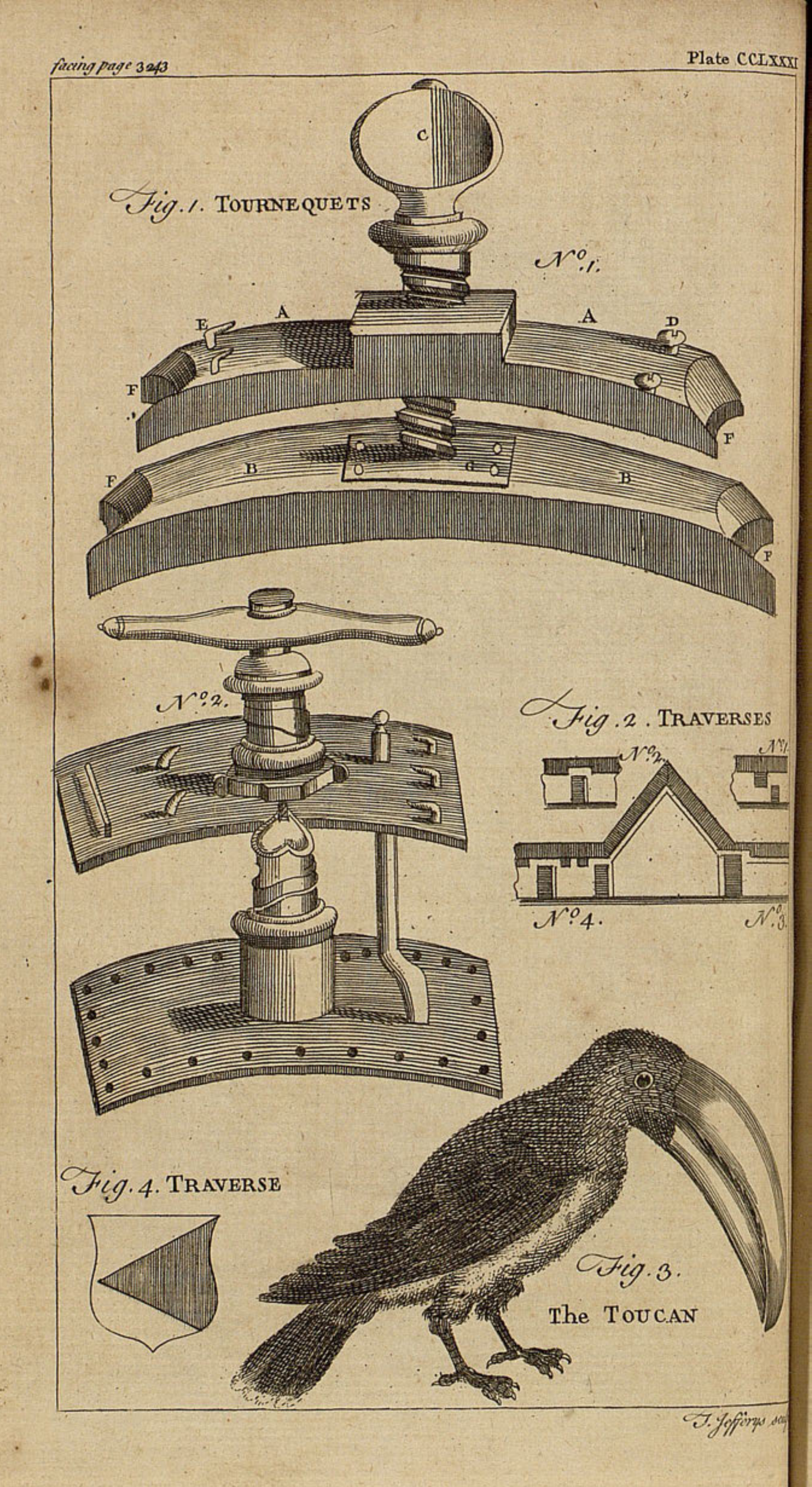
TOURNEQUET, in furgery, an inftrument made of rollers, compreffes, fcrews, &c. for compreffing any wounded part, fo as to ftop hæmorrhages. See the article HÆMORRHAGE.

The common tournequet is very fimple, confifting only of a roller, which, with the help of a fmall ftick, ferves to ftop the effufion of blood from large arteries, in amputations, by forcibly tying up the limb. The things neceffary for this are a roller, of a thumb's breadth, and of an ell in length, a fmall cylindrical ftick, a conglomerated bandage, two fingers thick and four long, fome compreffes of a good length and about three or four fingers breadth, to furround the legs and arms, and a fquare piece of ftrong paper or leather, about four fingers wide. See plate CCLXXX. fig. 1.

The manner of applying this inftrument is this; the rolled bandage is to be applied to the trunk of the wounded artery length ways, covering it, in a contrary direction, with compreffes furrounding the foot, leg, or arm, as it were with a ring; the roller muft be paffed twice round thefe applications, and faftened in a knot, but fo loofely that you may eafily introduce your hand between it and the part:




*J. Jefferys sculp.*


Fig. 1. TOURNEQUETS
N°. 1.
C
A
A
E
D
F
F
F
B
G
B
F
N°. 2.
Fig. 2. TRAVERSES
N°. 2.
N°. 1.
N°. 4.
N°. 3.
Fig. 4. TRAVERSE
Fig. 3.
The TOUCAN
T. Jefferys sculp.

part: the leather or thick paper muſt now be nicely placed under it, upon the external part of the leg, and the roller tightened by degrees, by turning round the ſtick, which is to be introduced into the knot; this to be done till the hæmorrhage is entirely ſtopped: the ſtick muſt now be kept in this ſituation till the wound is properly treated, and the return of the hæmorrhage is prevented. When this end is acquired, the tournequet is to be looſened, or entirely taken off, as ſhall be judged moſt convenient; but where it is applied to the arm, the rolled bandage is to be placed near the axilla, in the internal part of the humerus, and the ſtick in this caſe is to be faſtened on the oppoſite ſide, the ſituation of the artery there requiring this poſition: and when it is to be applied to the thighs, the bandage is to be put as the caſe ſhall require, either to the upper part of the thigh, or juſt over the knee.

But beſides the common tournequet, there are other more complex forms of this inſtrument. *Ibid.* fig. 2. is a braſs-tournequet, for ſtopping the hæmorrhages in wounds of large arteries; where A A is a braſs-plate, ſomewhat bent; B B, a ſtrong braſs-ſcrew; C, a round plate, to be fixed upon the wound; D, the button which turns the ſcrew; E E, a ſtrong leather-belt, to ſurround the wounded part; F F, part of the belt pierced with holes, whereby it may be fixed upon the belt G G, and lengthened and ſhortened according to the ſize of the limb.

*Ibid.* fig. 3. is another braſs-tournequet, after Petit's manner, the uſe and application of which will be eaſily underſtood from the deſcription of fig. 2.

In plate CCLXXXI. fig. 1. n° 1. is delineated a wooden tournequet, where A A is the upper part; B B, the lower part; C, the ſcrew; D, the two ſmall iron-ſcrews, to which a leather or ſilk belt is to be fixed; E, hooks, on which to faſten the other end of the belt; F F, the ends of the upper and lower parts of the inſtrument, hollowed to receive the belt, and keep it ſteady in its ſituation.

*Ibid.* n° 2. is another kind of tournequet, made of iron, the parts and uſes of which will be eaſily conceived from what has been already ſaid.

TOURNON, a town of Languedoc, in France, fifty miles ſouth of Lyons.

TOURS, a city of France, ſixty miles ſouth-weſt of Orleans.

TOWAGE, the hawling or drawing of a ſhip, barge, *&c.* by men or beaſts, or by another ſhip or boat, faſtened to her, in order to make her enter a port, aſcend a river, *&c.*

TOWER, *turris*, a tall building, conſiſting of ſeveral ſtories, uſually of a round form, though ſometimes ſquare or polygonal.

Towers are built for fortreſſes, priſons, *&c.* as the Tower of London, the Tower of the Baſtile, *&c.*

The Tower of London is not only a citadel, to defend and command the city, river, *&c.* but alſo a royal palace, where our kings, with their courts, have ſometimes lodged: a royal arſenal, wherein are arms and ammunition for ſixty thouſand ſoldiers; a treaſury for the jewels and ornaments of the crown; a mint for coining of money; the great archive, wherein are preſerved all the antient records of the courts of Weſtminſter, *&c.* and the chief priſon for ſtate criminals.

TOWN, a place inhabited by a conſiderable number of people, being of a middle ſize between a city and village.

*Hanſe*-TOWNS. See HANSE.

TOXICODENDRON, the POISON-OAK, in botany, a ſpecies of rhus, or ſumach, with a ſmooth and ſtriated berry, containing a ſulcated and compreſſed nucleus. See the article SUMACH.

Poiſon-oak is ſaid to poiſon two ways, by handling of it, and by the ſmell. The ſcent of it, when cut down in the woods, has poiſoned many people, and many more have ſuffered by it while burning in their fires. People with only handling it have been made blind for ſeveral days; and perſons who ſit near a fire when it is burning, are often ſwelled and choaked up in all parts of the body, in a terrible manner.

TOXICUM, POISON. See POISON.

TOZZIA, in botany, a genus of the didynamia-angioſpermia claſs of plants, with a monopetalous ringent flower; the upper lip of which is bifid, and the lower one trifid; the fruit is a globoſe unilocular capſule, containing an ovated ſeed.

TRABEATION, in the antient architecture, the ſame with entablature. See the article ENTABLATURE.

TRACES *of the brain*, among the carteſians, denotes the impreſſions which ſenſible objects make on the fine fibres of the brain, by means of the organs of ſenſe; on which impreſſions memory, imagination, *&c.* are ſuppoſed, in a great meaſure, to depend. See MEMORY, *&c.*

TRA-

TRACHEA, in anatomy, called alfo afpera arteria, and in englifh the windpipe, is a tube or canal, extended from the mouth to the lungs; its fituation is in the middle and anterior part of the neck; and it is connected with the fauces, the lungs, and the œfophagus. Anatomifts commonly divide it into two parts, the larynx, and afpera arteria properly fo called. See the article LARYNX.

The trachea, or afpera arteria properly fo called, is that whole cartilaginous canal, extended from the larynx, which is only its mouth or entrance, to the bronchia or lungs; being, in fome meafure, of a conic figure. Its beginning is cylindrical, and capable of admitting a finger; and its other end is fomewhat narrower. It enters the thorax under the fternum, and is there divided into two branches, before it enters the lungs: it is compofed of eighteen or nineteen, fometimes but fixteen, fometimes twenty, cartilaginous rings, and four coats. Thefe rings are imperfect, the hinder part of the trachea being membranaceous. Of the four coats, the exterior is membranaceous, the fecond glandulous, the third mufcular, and the fourth or internal covering is tendinous and robuft.

The ufes of the trachea are, to affift in deglutition, and to be affiftant to the lungs: on the exterior part of it are the thyroide and bronchial glands, which fecrete an humour to moiften it: its arteries are from the external carotids, the veins from the jugulars, and the nerves from the recurrent ones of the plexus cervicalis. See the articles GLAND, ARTERY, VEIN, &c.

The tracheæ of vegetables are certain air-veffels, difcernible in many plants, but in none more diftinctly than in the melon.

TRACHELIUM, in botany, a genus of the pentandria-monogynia clafs of plants, with a funnel-fafhioned flower, divided into five fegments at the limb; the fruit is a roundifh obtufely trilobous capfule, containing a great number of very minute feeds.

TRACHENBERG, a town of Silefia, twenty five miles north of Breflaw.

TRACHEOTOMY, in furgery, the name of an operation otherwife called bronchotomy. See BRONCHOTOMY.

TRACHINUS, in ichthyology, a genus of the acanthopterygeous fifhes, the opercula of whofe gills are pointed, and the eyes placed near one another, in the upper part of the head; there are two back-fins, and the firft very fhort.

To this genus belong the draco and uranofcopus. See the articles DRACO and URANOSCOPUS.

TRACING, or TRAINING, in mineralogy. See the article TRAINING.

TRACT, in geography, an extent of ground, or a portion of the earth's furface.

TRACT, in matters of literature, denotes a fmall treatife, or written difcourfe, upon any fubject.

TRACTION, the act of drawing, whereby a thing is brought nearer to the mover.

TRACTRIX, in geometry, a curve otherwife called catenaria. See CATENARIA.

TRADE, in general, denotes the fame with commerce, confifting in buying, felling, and exchanging of commodities, bills, money, &c. See COMMERCE, COIN, MONEY, COMPANY, &c.

TRADE-WINDS, denote certain regular winds at fea, blowing either conftantly the fame way, or alternately this way and that; thus called from their ufe in navigation, and the indian commerce.

The trade winds are of different kinds, fome blowing three or fix months of the year one way, and then the like fpace of time the oppofite way; thefe are very common in the indian feas, and are called monfoons. See the article MONSOON. Others blow conftantly the fame way; fuch is that general wind between the tropics, which off at fea, is found to blow all day long from eaft to weft. For the phænomena of each, with their phyfical caufes, fee the article WIND.

TRADESCANTIA, in botany, a genus of the hexandria-monogynia clafs of plants, the flower of which confifts of three orbiculated, plane, and very patent petals; and its fruit is an oval trilocular capfule, containing a few angulated feeds.

TRADITION, among ecclefiaftical writers, denotes certain regulations regarding the rites, ceremonies, &c. of religion, which we fuppofe to have been handed down from the days of the apoftles, to the prefent time.

Tradition is diftinguifhed into written, whereof there are fome traces in the writings of the antient fathers; and unwritten, whereof no mention is made in the writers of the firft ages of chriftianity.

TRAER-

TRAERBACH, a town of Germany, fituated on the Mofelle, twenty miles north-eaft of Triers.

TRAFFIC. See the articles TRADE and COMMERCE.

TRAGACANTH, *tragacantha*, in botany, a genus of the diadelphia-decandria clafs of plants, with a papilinaceous flower; its fruit is a fhort bilocular pod, of a roundifh figure, and containing a few kidney-fhaped feeds.

Gum-tragacanth, or, as fome call it, gum-adragant, or gum-dragon, is the produce of this fhrub, which grows to about four feet high, and has a firm and robuft ftem, with numerous branches. The gum is brought to us in long and flender pieces, of a flatted figure, more or lefs, and thefe not ftrait, or rarely fo; but commonly twifted and contorted various ways, fo as to refemble worms. We fometimes meet with it like the other vegetable exfudations, in roundifh drops, but thefe are much more rare. It is moderately heavy, of a firm confiftence, and, properly fpeaking, very tough rather than hard, and is extremely difficult to powder, unlefs firft carefully dried, and the mortar and peftle kept warm. Its natural colour is a pale whitifh, and in the cleaneft pieces it is fomething tranfparent. It is often, however, met with tinged brownifh, and of other colours, and more opake. It has no fmell, and very little tafte, but what it has is difagreeable. Taken into the mouth, it does not grow clammy, and ftick to the teeth, as the gum-arabic does, but melts into a kind of very foft mucilage. It diffolves in water but flowly, and communicates its mucilaginous quality to a great quantity of that fluid. It is by no means foluble in oily or fpirituous liquors, nor is it inflammable. It is brought to us from the ifland of Crete, and from feveral parts of Afia. It is to be chofen in long twifted pieces, of a whitifh colour, very clear, and free from all other colours; the brown, and particularly the black, are wholly to be rejected.

Tragacanth has the fame virtues with gum-arabic, but in a greater degree. It greatly infpiffates and obtunds the acrimony of the humours, and is therefore found of vaft fervice in inveterate coughs, and other diforders of the breaft, arifing from an acrid phlegm, and in ftranguries, heat of urine, and all other complaints of that kind. It is ufually given in the compound powder, called the fpecies diatragacanthi frigidæ, rarely alone. It is alfo, by fome, efteemed a very great external remedy for wounds, and in this fenfe made an ingredient in fome fympathetic powders, with vitriol and other things. It is by fome recommended alone, in form of a powder or ftrong mucilage, for cracks and chaps in the nipples of women: but it is found, by experience, to be a very troublefome application in thofe cafes, and to do more harm than good, as it dries by the heat of the part, and draws the lips of the wound farther afunder than before.

TRAGEA, in pharmacy, an aromatic powder, grofly beaten and mixed with fugar, taken by way of carminative.

TRAGEDY, a dramatic poem, reprefenting fome fignal action performed by illuftrious perfons, and which has frequently a fatal iffue, or end. See DRAMA.

Ariftotle, more fcientifically, defines tragedy, the imitation of one grave and entire action, of a juft length, and which, without the affiftance of narration, by raifing of terror and compaffion, refines and purges our paffions. This definition has given the critics fome perplexity; and Corneille declares he cannot reconcile Ariftotle with himfelf: the inftances Ariftotle cites, he thinks, ruin his own definition; he even denies the purging our paffions to be the end of tragedy. Our englifh authors are more favourable to the definition; by the purging our paffions, they underftand not the extirpating them, but the reducing them to juft bounds; for by fhewing the miferies that attend a fubjection to them, it teaches us to watch them more narrowly; and by feeing the great misfortunes of others, it leffens the fenfe of our own.

Tragedy, in its original, M. Hedelin obferves, was only a hymn fung in honour of Bacchus, by feveral perfons, who, together, made a chorus of mufic, with dances and inftruments. As this was long, and might fatigue the fingers, as well as tire the audience, they bethought themfelves to divide the finging of the chorus into feveral parts, and to have certain recitations in the intervals. Accordingly Thefpis firft introduced a perfon upon the ftage with this view. Æfchylus, finding one perfon infufficient, introduced a fecond, to entertain the audience more agreeably, by a kind of dialogue: he alfo cloathed his perfons more decently, and firft put on them the bufkin. See HYMN, CHORUS, BUSKIN, &c.

The perſons who made theſe recitations on the ſcene, were called actors; ſo that tragedy was at firſt without actors. And what they thus rehearſed, being things added to the ſinging of the chorus, whereof they were no neceſſary part, were called epiſodes. See the article EPISODE.

Sophocles found that two perſons were not enough for the variety of incidents, and accordingly introduced a third: and here the Greeks ſeem to have ſtopped; at leaſt, it is very rare that they introduced four ſpeakers in the ſame ſcene.

Tragedy and comedy were, at firſt, confounded with each other, but were afterwards ſeparated; and the poets applied themſelves to the cultivating of tragedy, neglecting comedy. See COMEDY.

When tragedy was got into a better form, they changed the meaſure of its verſe, and endeavoured to bring the action within the compaſs of a day, or of a revolution of the ſun. See the article UNITY.

For the ſeveral parts of tragedy, ſee the articles ACT, SCENE, ACTION, FABLE, CHARACTERS, MANNERS, &c.

The Engliſh received the firſt plan of their drama from the French, among whom it had its riſe towards the end of Charles V. under the title of chant-royal, which conſiſted of pieces in verſe, compoſed in honour of the Virgin, or ſome of the ſaints, and ſung on the ſtage: they were called by the title of chant-royal, becauſe the ſubject was given by the king of the year, or the perſon who had borne away the prize the year preceding.

The humour of theſe pieces ran wonderfully among the people, inſomuch that in a little time there were formed ſeveral ſocieties, who began to vie with each other: one of theſe, to engage the town from the reſt, began to intermix various incidents or epiſodes, which they diſtributed into acts, ſcenes, and as many different perſons as were neceſſary for the repreſentation. Their firſt eſſay was in the Bourg St. Maur, and their ſubject the paſſion of our Saviour. The provoſt of Paris prohibiting their continuing it, they made application to court; and to render it the more favourable to them, elected themſelves into a friary or fraternity, under the title of brothers of the paſſion: which title has given ſome occaſion to ſuſpect them to have been an order of religious. The king, on ſeeing and approving ſome of their pieces, granted them letters of eſtabliſhment, in 1402; upon which they built a theatre, and for an age and a half acted none but grave pieces, which they called moralities; till, the people growing weary of them, they began to intermix farces, or interludes, from prophane ſubjects.

This mixture of farce and religion diſpleaſing many, they were re-eſtabliſhed by an arret of parliament, in 1548, on condition of their acting none but proper, lawful, and decent ſubjects, without intermeddling with any of the myſteries of religion; and thus were the brothers of the paſſion deſpoiled of their religious character: upon which they mounted the ſtage no more in perſon, but brought up a new ſet of comedians, who acted under their direction.

Thus was the drama eſtabliſhed, and on this foundation arrived in England. In proceſs of time, as it was improved, it became divided into two branches, agreeable to the practice of the antients, and the nature of things, *viz.* into tragedy and comedy, properly ſo called; and this laſt again was ſubdivided into pure comedy and farce. See the articles COMEDY and FARCE.

TRAGI-COMEDY, a dramatic piece partaking of the nature both of tragedy and comedy, the event whereof is not bloody or unhappy, and wherein is admitted a mixture of leſs ſerious characters.

The foundation of tragi-comedy is certainly bad; for endeavouring to make us laugh and cry by turns, it endeavours at contrary motions, which the heart can never undergo; every thing that diſpoſes for the one, indiſpoſing for the other: for which reaſon it is at preſent, with great juſtice, diſuſed. However, tragi-comedy is the only way wherein comedy is allowed to introduce kings and heroes.

TRAGIA, in botany, a genus of the monoecia-tetrandria claſs of plants, without any flower petals; its fruit is a very large tricoccous capſule, of a roundiſh figure, containing ſingle and roundiſh ſeeds.

TRAGOPOGON, GOAT'S BEARD, in botany, a genus of the ſyngeneſia polygamia claſs of plants, the compound flower of which is imbricated and uniform, being compoſed of a multitude of ligulated ſemi-floſcules, quinquedentated at the ends, and ſtanding on the embryo-ſeeds, which are enveloped in a covering, and winged with down.

TRAGUS, τράγος, in anatomy, one of the protuberances of the auricle, or external ear, called alſo hircus, becauſe uſually

ufually hairy. The tragus is that protuberance next the temple: that on the oppofite fide, to which the foft lobe of the ear is annexed, is called the antitragus. See the article EAR.

TRAJAN COLUMN, a famous hiftorical column erected in Rome, in honour of the emperor Trajan. It is of the tufcan order, though fomething irregular; its height is eight diameters, and its pedeftal corinthian: it was built in a large fquare there, called Forum Romanum. Its bafe confifts of twelve ftones, of an enormous fize, and it is raifed on a focle, or foot of eight fteps; within fide is a ftair-cafe, illuminated with forty-four windows. It is 140 feet high, which is thirty-five fhort of the antonine column, but the workmanfhip of the former is much more valued. It is adorned from top to bottom with baffo relievo's, reprefenting the great actions of that emperor againft the Dacæ.

TRAJECTORY *of a comet*, is its path or orbit, or the line it defcribes in its motion. See the article COMET.

TRAIL-BOARD, in a fhip, a carved board on each fide of her beak, which reaches from the main ftem to the figure, or the brackets.

TRAIN, the attendance of a great perfon, or the trail of a gown, or robe of ftate. In falconry, it denotes the tail of an hawk.

TRAIN, is likewife ufed for the number of beats which a watch makes in an hour, or any other certain time.

TRAIN, is alfo ufed for a line of gunpowder, laid to give fire to a quantity thereof, in order to do execution by blowing up earth, works, buildings, &c.

TRAIN, or TRAILE OF ARTILLERY, includes the great guns, and other pieces of ordnance belonging to an army in the field. See the article CANNON.

TRAIN-OIL, the oil procured from the blubber of a whale by boiling. See the articles OIL and WHALE.

TRAIN-BANDS, or TRAINED-BANDS, a name given to the militia of England. See the article MILITIA.

TRAINING, or TRACING, in mineralogy, a term ufed by the miners, to exprefs the tracing up the mineral appearances on the furface of the earth to their head, or original place, and there finding a mine of the metal they contain. See MINE.

TRAITOR, or TRAYTOR, a perfon guilty of treafon. See TREASON.

TRALOS MONTES, a province of Portugal, bounded by Spain on the north-eaft; by the province of Beira on the fouth; and by Entreminho Douro on the weft.

TRAMBLING *of tin ore*, among miners, the wafhing it very clean, which is done in a fhovel, and in a frame of boards. See the article TIN.

TRAMEL, an inftrument, or device, fometimes of leather, more ufually of rope, fitted to a horfe's legs, to regulate his motions, and form him to an amble. It is alfo taken in many places for an iron moveable inftrument in chimnies to hang pots over the fire.

TRAMEL-NET, is a long net wherewith to take fowl by night in champain countries, much like the net ufed for the low bell, both in fhape, bignefs, and mafhes. To ufe it, they fpread it on the ground, fo as the nether or farther end fitted with fmall plumbets, may lie loofe thereon; then the other part being borne up by men placed at the fore ends, it is thus trailed along the ground. At each fide are carried great blazing lights, by which the birds are raifed, and as they rife under the net they are taken.

TRAMONTANE, or TRAMONTAIN, fomething beyond, or on the farther fide the mountains, applied particularly by the Italians, to fuch as live on the other fide the Alps, *i. e.* all out of Italy, as the Germans, Flemifh, French, &c.

TRANGLE, in heraldry, the diminutive of a fefs, commonly called a bar. See the article FESS and BAR.

TRANI, a port-town of Italy, in the kingdom of Naples, and territory of Barri, fituated on the gulph of Venice, twenty miles weft of Barri.

TRANSACTION, *tranfactio*, in the civil law, an accommodation of fome bufinefs, or difpute between two parties, by a mutual and voluntary agreement between them. See ACCOMMODATION.

*Philofophical* TRANSACTIONS, a kind of journal of the principal things that come before the Royal Society of London. See the article SOCIETY.

It appears, that the printing of thefe tranfactions was always, from time to time, the fingle act of the refpective fecretaries of the fociety, till the publication of the 47th volume, in 1753, notwithftanding it has been the common opinion, that they were publifhed by the authority and under the direction of the fociety itfelf. The truth is, that the fociety, as a body, never did intereft themfelves further in their publication, than by occafionally recommending the

revival of them to ſome of their ſecretaries, when, from the particular circumſtances of their affairs, the tranſactions had happened for any length of time to be intermitted, and this ſeems principally to have been done with a view to ſatisfy the public, that their uſual meetings were then continued for the improvement of knowledge and benefit of mankind, the great ends of their firſt inſtitution; but the ſociety being of late years greatly enlarged, and their communications more numerous, they thought it adviſeable, that a committee of their members ſhould be appointed to re-conſider the papers read before them, and ſelect out of them ſuch as they ſhould judge proper for publication in the future tranſactions, which was accordingly done upon the 26th of March, 1752.

TRANSCENDENTAL, or TRANSCENDANT, ſomething elevated, or raiſed above other things; which paſſes and tranſcends the nature of other inferior things.

Tranſcendental quantities, among geometricians, are indeterminate ones, or ſuch as cannot be fixed or expreſſed by any conſtant equation: ſuch are all tranſcendental curves, which cannot be defined by any algebraic equation; or which, when expreſſed by an equation, one of the terms thereof is a variable quantity. Now whereas algebraiſts uſe to aſſume ſome general letters or numbers, for the quantity ſought in theſe tranſcendental problems, Mr. Leibnitz aſſumes general or indefinite equations for the lines ſought; *e. gr.* putting $x$ and $y$ for the abſciſs and ordinate, the equation he uſes for a line ſought is $a+bx+cy+exy+fxx+gyy$ &c. $=o$, by the help of which indefinite equation, he ſeeks the tangent; and by comparing the reſult with the given property of tangents, he finds the value of the aſſumed letters $a$, $b$, $c$, $d$, &c. and thus defines the equation of the line ſought.

If the compariſon above-mentioned, do not proceed, he pronounces the line ſought not to be an algebraical, but a tranſcendental one. This ſuppoſed, he goes on to find the ſpecies of tranſcendency; for ſome tranſcendentals depend on the general diviſion or ſection of a ratio, or upon the logarithms; others, upon the arcs of a circle; and others, on more indefinite and compound enquiries. He therefore, beſides the ſymbols $x$ and $y$, aſſumes a third, as $v$, which denotes the tranſcendental quantity; and of theſe three, forms a general equation for the line ſought, from which he finds the tangent, according to the differential method, which ſucceeds even in tranſcendental quantities. The reſult he compares with the given properties of the tangent, and ſo diſcovers, not only the values of $a$, $b$, $c$, $d$, &c. but alſo the particular nature of the tranſcendental quantity. And though it may ſometimes happen, that the ſeveral tranſcendentals are ſo to be made uſe of, and thoſe of different natures too, one from another; alſo, though there be tranſcendents of tranſcendentals, and a progreſſion of theſe in infinitum: yet we may be ſatisfied with the moſt eaſy and uſeful one; and for the moſt part, may have recourſe to ſome peculiar artifices for ſhortening the calculus, and reducing the problem to as ſimple terms as may be.

This method being applied to the buſineſs of quadratures, or to the invention of quadratices, in which the property of the tangent is always given, it is manifeſt, not only how it may be diſcovered, whether the indefinite quadrature may be algebraically impoſſible; but alſo, how, when this impoſſibility is diſcovered, a tranſcendental quadratrix may be found, which is a thing not before ſhewn. So that it ſeems, that geometry, by this method, is carried infinitely beyond the bounds to which Vieta and Des Cartes brought it; ſince, by this means, a certain and general analyſis is eſtabliſhed, which extends to all problems of no certain degree, and conſequently not comprehended within algebraical equations.

Again, in order to manage tranſcendental problems, wherever the buſineſs of tangents or quadratures occurs, by a calculus, there is hardly any that can be imagined ſhorter, more advantageous, or more univerſal, than the differential calculus, or analyſis of indiviſibles and infinites.

By this method, we may explain the nature of tranſcendental lines, by an equation; *e. gr.* let $a$ be the arch of a circle, and $x$ the verſed ſine; then will $a = \frac{S dx}{\sqrt{2x-xx}}$; and if the ordinate of the cycloid be $y$, then will $y = \sqrt{2x-xx} + \frac{S dx}{\sqrt{2x-xx}}$; which equation perfectly expreſſes the relation between the ordinate $y$ and the abſciſs $x$, and from it

all

all the properties of the cycloid may be demonstrated.

Thus is the analytical calculus extended to those lines, which have hitherto been excluded; for no other reason, but that they were thought incapable of it.

TRANSCOLATION, in pharmacy, the same with filtration, or percolation. See the article FILTRATION.

TRANSCRIPT, a copy of any original writing, particularly that of an act, or instrument, inserted in the body of another.

TRANSFER, in commerce, *&c.* an act whereby a person surrenders his right, interest, or property in any thing moveable or immoveable to another.

The term transfer, is chiefly used for the assigning and making over shares in the stocks, or public funds, to such as purchase them of the proprietors.

TRANSFORMATION, in general, denotes a change of form, or the assuming a new form different from a former one.

The chemists have been for a long time seeking the transformation of metals; that is, their transmutation, or the manner of changing them into gold. See the article TRANSMUTATION.

TRANSFORMATION *of equations.* The doctrine of the transformation of equations, and of exterminating their intermediate terms, is thus taught by Mr. Mac Laurin. The affirmative roots of an equation are changed into negative roots of the same value, and the negative roots into affirmative, by only changing the signs of the terms alternately, beginning with the second. Thus, the roots of the equation $x^4 - x^3 - 19x^2 + 49x - 30 = 0$ are $+1$, $+2$, $+3$, $-5$; whereas the roots of the same equation having only the signs of the second and fourth terms changed, *viz.* $x^4 + x^3 - 19x^2 - 49x - 30 = 0$, are $-1$, $-2$, $-3$, $+5$.

To understand the reason of this rule, let us assume an equation, as $\overline{x-a} \times \overline{x-b} \times \overline{x-c} \times \overline{x-d} \times \overline{x-e}$, &c. $= 0$, whose roots are $+a$, $+b$, $+c$, $+d$, $+e$, &c. and another having its roots of the same value, but affected with contrary signs, as $\overline{x+a} \times \overline{x+b} \times \overline{x+c} \times \overline{x+d} \times \overline{x+e}$, &c. $= 0$. It is plain, that the terms taken alternately, beginning from the first, are the same in both equations, and have the same sign, being products of an even number of the roots; the product of any two roots having the same sign as their product when both their signs are changed; as $+a \times -b = -a \times +b$.

But the second terms and all taken alternately from them, because their coefficients involve always the products of an odd number of the roots, will have contrary signs in the two equations. For example, the product of four, *viz.* $abcd$, having the same sign in both, and one equation in the fifth term having $abcd \times +e$, and the other $abcd \times -e$, it follows, that their product $abcde$ must have contrary signs in the two equations: These two equations, therefore, that have the same roots, but with contrary signs, have nothing different but the signs of the alternate terms, beginning with the second. From which it follows, that if any equation is given, and you change the signs of the alternate terms, beginning with the second, the new equation will have roots of the same value, but with contrary signs. See EQUATION.

It is often very useful to transform an equation into another that shall have its roots greater or less than the roots of the proposed equation by some given difference.

Let the equation proposed be the cubic $x^3 - px^2 + qx - r = 0$. And let it be required to transform it into another equation, whose roots shall be less than the roots of this equation by the given difference $(e)$; that is, suppose $y = x - e$, and, consequently, $x = y + e$; then, instead of $x$, and its powers, substitute $y + e$, and its powers, there will arise this new equation:

$$(A)\left.\begin{array}{r} y^3 + 3ey^2 + 3e^2y + e^3 \\ - py^2 - 2pey - pe^2 \\ + qy + qe \\ - r \end{array}\right\} = 0$$

whose roots are less than the roots of the preceding equation by the difference $(e)$.

If it had been required to find an equation whose roots should be greater than those of the proposed equation by the quantity $(e)$, then we must have supposed $y = x + e$, and, consequently, $x = y - e$, and then the other equation would have had this form:

$$(B)\left.\begin{array}{r} y^3 - 3ey^2 + 3e^2y - e^3 \\ - py^2 + 2pey - pe^2 \\ + qy - qe \\ - r \end{array}\right\} = 0$$

If the proposed equation be in this form, $x^3 + px^2 + qx + r = 0$, then, by supposing $x + e = y$, there will arise an equation agreeing, in all respects, with the equation

equation ($A$), but that the fecond and fourth terms will have contrary figns.

And by fuppofing $x - e = y$, there will arife an equation agreeing with ($B$), in all refpects; but that the fecond and fourth terms will have contrary figns to what they have in ($B$).

The firft of thefe fuppofitions gives this equation,

$$(C)\; \left.\begin{array}{r} y^3 - 3ey^2 + 3e^2y - e^3 \\ + py^2 - 2pey + pe^2 \\ + \quad qy - qe \\ + r \end{array}\right\} = 0$$

The fecond fuppofition gives the equation,

$$(D)\; \left.\begin{array}{r} y^3 + 3ey^2 + 3e^2y + e^3 \\ + py^2 + 2epy + pe^2 \\ + \quad qy + qe \\ + r \end{array}\right\} = 0$$

The firft ufe of this transformation of equations is to fhew how the fecond (or other intermediate) term may be taken away out of an equation.

It is plain, that in the equation ($A$), whofe fecond term is $\overline{3e-p} \times y^2$, if you fuppofe $e = \frac{1}{3}p$, and confequently, $3e - p = 0$, then the fecond term will vanifh.

In the equation ($C$), whofe fecond term is $\overline{-3e+p} \times y^2$, fuppofing $e = \frac{1}{3}p$, the fecond term alfo vanifhes.

Now the equation ($A$) was deduced from $x^3 - px^2 + qx - r = 0$, by fuppofing $y = x - e$: and the equation ($C$) was deduced from $x^3 + px^2 + qx + r = 0$, by fuppofing $y = x + e$. From which this rule may eafily be deduced for exterminating the fecond term out of any cubic equation.

Rule. Add to the unknown quantity of the given equation the third part of the coefficient of the fecond term, with its proper fign, *viz.* $\mp \frac{1}{3}p$, and fuppofe this aggregate equal to a new unknown quantity ($y$). From this value of $y$, find a value of $x$ by tranfpofition, and fubftitute this value of $x$, and its powers, in the given equation, and there will arife a new equation that fhall want the fecond term.

Example. Let it be required to exterminate the fecond term out of this equation, $x^3 - 9x^2 + 26x - 34 = 0$, fuppofe $x - 3 = y$, or $y + 3 = x$; and fubftituting according to the rule, you will find

$$\left.\begin{array}{r} y^3 + 9y^2 + 27y + 27 \\ -9y^2 - 54y - 81 \\ +26y + 78 \\ -34 \end{array}\right\} = 0$$

$$\overline{y^3 \;*\; - y - 10} = 0$$

In which there is no term where $y$ is of two dimenfions, and an afterifk is placed in the room of the fecond term, to fhew it is wanting.

Let the equation propofed be of any number of dimenfions reprefented by ($n$); and let the coefficient of the fecond term, with its fign prefixed, be $-p$; then fuppofing $x - \frac{p}{n} = y$, and, confequently, $x = y + \frac{p}{n}$, and, fubftituting this value for $x$ in the given equation, there will arife a new equation that fhall want the fecond term.

It is plain, that the fum of the roots of the propofed equation is $+p$; and fince we fuppofe $y = x - \frac{p}{n}$, it follows, that in the new equation, each value of $y$ will be lefs than the refpective value of $x$ by $\frac{p}{n}$; and fince the number of the roots is $n$, it follows, that the fum of the values of $y$ will be lefs than $+p$, the fum of the values of $x$, by $n \times \frac{p}{n}$, the difference of any two roots; that is, by $+p$: therefore, the fum of the values of $y$ will be $+p - p = 0$.

But the coefficient of the fecond term of the equation of $y$ is the fum of the values of $y$, viz. $+p - p$, and, therefore, that coefficient is equal to nothing; and, confequently, in the equation of $y$, the fecond term vanifhes. It follows then that the fecond term may be exterminated out of any given equation by the following

Rule. Divide the coefficient of the fecond term of the propofed equation by the number of dimenfions of the equation; and affuming a new unknown quantity $y$, add to it the quotient, having its fign changed. Then fuppofe this aggregate equal to $x$, the unknown quantity in the propofed equation; and for $x$, and its powers, fubftitute the aggregate and its powers, fo fhall the new equation, that arifes, want its fecond term.

If the propofed equation is a quadratic, as $x^2 - px + q = 0$, then, according to the rule, fuppofe $y + \frac{1}{2}p = x$, and, fubftituting this value for $x$, you will find

$$\left.\begin{array}{r} y^2 + py + \frac{1}{4}p^2 \\ -py - \frac{1}{2}p^2 \\ + \quad q \end{array}\right\} = 0$$

$$\overline{y^2 \;*\; - \tfrac{1}{4}p^2 + q} = 0$$




As

And from this example, the uſe of exterminating the ſecond term appears: for, commonly, the ſolution of the equation, that wants the ſecond term, is more eaſy. And, if you can find the value of $y$ from this new equation, it is eaſy to find the value of $x$ by means of the equation $y + \frac{1}{2}p = x$. For example, Since $y^2 + q - \frac{1}{4}p^2 = o$, it follows, that $y^2 = \frac{1}{4}p^2 - q$, and $y = \pm\sqrt{\frac{1}{4}p^2 - q}$, ſo that $x = y + \frac{1}{2}p = \frac{1}{2}p \pm \sqrt{\frac{1}{4}p^2 - q}$.

If the propoſed equation is a biquadratic, as $x^4 - px^3 + qx^2 - rx + s = o$, then by ſuppoſing $x - \frac{1}{4}p = y$, or $x = y + \frac{1}{4}p$, an equation ſhall ariſe having no ſecond term. And if the propoſed is of five dimenſions, then you muſt ſuppoſe $x = y \pm \frac{1}{5}p$. And ſo on.

When the ſecond term in any equation is wanting, it follows, that the equation has both affirmative and negative roots, and that the ſum of the affirmative roots is equal to the ſum of the negative roots: by which means, the coefficient of the ſecond term, which is the ſum of all the roots of both ſorts, vaniſhes, and makes the ſecond term vaniſh.

In general, the coefficient of the ſecond term is the difference between the ſum of the affirmative roots and the ſum of the negative roots: and the operations we have given ſerve only to diminiſh all the roots, when the ſum of the affirmative is greateſt, or increaſe the roots when the ſum of the negative is greateſt, ſo as to balance them, and reduce them to an equality.

It is obvious, that, in a quadratic equation that wants a ſecond term, there muſt be one root affirmative, and one negative; and theſe muſt be equal to one another.

In a cubic equation that wants the ſecond term, there muſt be either two affirmative roots equal, taken together, to a third root that muſt be negative; or, two negative equal to a third that muſt be poſitive.

Let an equation $x^3 - px^2 + qx - r = o$ be propoſed, and let it be now required to exterminate the third term.

By ſuppoſing $y = x - e$, the coefficient of the third term in the equation of $y$ is found (ſee equation $A$) to be $3e^2 - 2pe + q$. Suppoſe that coefficient equal to nothing, and by reſolving the quadratic equation $3e^2 - 2pe + q = o$, you will find the value of $e$, which, ſubſtituted for it in the equation $y = x - e$, will ſhew how to transform the propoſed equation into one that ſhall want the third term.

The quadratic $3e^2 - 2pe + q = o$ gives $e = \frac{p \pm \sqrt{p^2 - 3q}}{3}$.

So that the propoſed cubic will be tranſformed into an equation wanting the 3d term, by ſuppoſing $y = x - \frac{p - \sqrt{p^2 - 3q}}{3}$, or $y = x - \frac{p + \sqrt{p^2 - 3q}}{3}$.

If the propoſed equation is of $n$ dimenſions, the value of $e$, by which the third term may be taken away, is had by reſolving the quadratic equation $e^2 + \frac{2p}{n} \times e + \frac{2q}{n \times n-1} = o$, ſuppoſing $-p$ and $+q$ to be the coefficients of the ſecond and third terms of the propoſed equation.

The fourth term of any equation may be taken away by ſolving a cubic equation, which is the coefficient of the fourth term in the equation when transformed. The fifth term may be taken away by ſolving a biquadratic; and, after the ſame manner, the other terms can be exterminated, if there are any.

TRANSFUSION, *transfuſio*, the act of pouring a liquor out of one veſſel into another.

TRANSFUSION *of the blood*, in ſurgery, the conveying the arterial blood of one man or animal, into the veins of another. See the article INJECTION.

Notwithſtanding injections and transfuſions are ſeldom practiſed by our modern ſurgeons, they were highly celebrated, and often performed in the laſt century. The generality of phyſicians, not without reaſon, attribute moſt diſorders of the body to ſome vice in the blood, and therefore, ſome were led to think, that no method could be more ready to remove and correct that vice, than injecting a proper medicine in the veins to mix with the blood itſelf, or the transfuſing the ſound blood of one animal into the veins of another, inſtead of that which is diſeaſed. But notwithſtanding the vaſt expectations which had been formed by phyſicians from this operation, frequently the event turned out worſe than the diſeaſe; for we are told, that almoſt all the patients who have been treated this way,

way, degenerated into a ftupidity, foolifh-nefs, or a raving, or melancholy mad-nefs, or have been taken off with a fud-den death, either in, or not long after, the operations.

For the transfufion of blood into the veins, firft, a vein is to be opened in the patient's arm, or hand, and then a fmall tube of filver, brafs or ivory, thruft up-ward into it: the fame is to be done with the found perfon, only the tube muft here be inferted downward, towards the fmall end of the vein; this done, the fmalleft of the tubes is to be inferted into the other larger one, by which means, as much blood will pafs from the found perfon into the patient, as may be thought proper, and then the incifed veins are to be dreffed, or bound up, as in bleeding: if the patient does not recover after one transfufion, the opera-tion fhould be repeated again, at con-venient intervals; but before the patient receives the blood of the found perfon, he ought to be bled proportionably, that the new blood laft received, may have the freer circulation. Sometimes a vein is opened in each arm of the patient at the fame time, that as much of the vi-tiated blood may flow out of one orifice as he receives of the found by the other. If the blood is to be transfufed out of fome animal into the patient, then a calf or a lamb, for example, is to be fecured by ligatures, and one of their veins or arteries opened in the neck, leg, or thigh, and the reft of the operation managed as before.

TRANSGRESSION, *tranfgreffio*, an of-fence againft fome law, or a breach or violation thereof.

TRANSGRESSIONE, in our law, is a writ ufually called a writ or action of trefpafs.

TRANSILVANIA, a principality bound-ed by the Carpathian mountains, which divide it from Poland on the north; by Moldavia on the eaft; by Walachia, and part of Hungary, on the fouth; and by another part of Hungary on the north; being about 120 miles long, and almoft as many broad, and lying between 22 and 25 degrees eaft long. and between 45 and 48° of north lat.

TRANSIT, *tranfitus*, in aftronomy, fig-nifies the paffage of any planet, juft by, or over a fixed ftar, or the fun, and of the moon in particular, covering or mov-ing over any planet.

TRANSITION, in mufic, is when a great-er note is broken into a lefs, to foften the roughnefs of a leap by a gradual paffage to the next note following; whence it is commonly called the breaking of a note. See NOTE and PASSAGE.

TRANSITION, in rhetoric, is of two forts. The firft is when a fpeech is introduced abruptly without exprefs notice given of it; as when Milton gives an account of our firft anceftors evening devotions.

Both turn'd, and under open fky ador'd
The God that made both air, fky, earth and heaven.—
——Thou alfo mad'ft the night,
Maker omnipotent, and thou the day!

The fecond fort of tranfition is, when a writer fuddenly leaves the fubject he is upon, and paffes unto another, from which it feems different at firft view, but has a relation and connection with it, and ferves to illuftrate and enlarge it.

TRANSITIVE, in grammar, an epithet applied to fuch verbs as fignify an action which paffes from the fubject that does it, to or upon another fubject which re-ceives it. Under the head of verbs tran-fitive, come what we ufually call verbs active and paffive; other verbs, whofe action does not pafs out of themfelves, are called neuters, and by fome gram-marians, intranfitives.

TRANSITORY, in common law, ftands in oppofition to local; thus actions are faid to be tranfitory, which may be laid in any county or place. See LOCAL.

TRANSLATION, the act of transferring or removing a thing from one place to another; we fay the tranflation of a bifhop's fee, a council, a feat of juftice, &c.

TRANSLATION is alfo ufed for the verfion of a book, or writing out of one lan-guage into another.

TRANSMARINE, fomething that comes from, or belongs to, the parts beyond fea.

TRANSMIGRATION, the removal or tranflation of a whole people into another country, by the power of a conqueror.

TRANSMIGRATION, is particularly ufed for the paffage of a foul out of one body into another, being the fame with what we otherwife call metemphfychofis. See the article METEMPHSYCHOSIS.

TRANSMISSION, in optics, &c. the act of a tranfparent body paffing the rays of light through its fubftance, or fuffer-ing them to pafs; in which fenfe the word ftands oppofed to reflection. Tranf-miffion is alfo frequently ufed in the fame fenfe with refraction, by which the bodies

bodies, in tranfmitting the rays, do alfo refract them. For the caufe of tranfmiffion, or the reafon why fome bodies tranfmit, and others reflect the rays, fee OPACITY and TRANSPARENCY.

The rays of light, Sir Ifaac Newton obferves, are fubject to fits of eafy tranfmiffion and reflection. See LIGHT.

TRANSMUTATION, the act of tranfforming, or changing one nature into another. Nature, Sir Ifaac Newton obferves, feems delighted with tranfmutations: he goes on to enumerate feveral kinds of natural tranfmutations; grofs bodies, and light, he fufpects, may be mutually tranfmuted into each other; and adds, that all bodies receive their active force from the particles of light, which enter their compofition. For all fixed bodies, when well heated, emit light as long as they continue fo; and again, light intermingles itfelf, and inheres in bodies, as often as its rays fall on the folid particles of thofe bodies. Again, water, which is a fluid, volatile, taftelefs falt, is by heat, tranfmuted into a vapour, which is a kind of air, and by cold, into ice, which is a cold tranfparent brittle ftone, eafily diffolvable, and this ftone is convertible again into water by heat, as vapour is by cold. See WATER, VAPOUR, ICE, &c.

Earth, by heat, becomes fire; and by cold, is converted into earth again; denfe bodies, by fermentation, are rarified into various kinds of air; and that air, by fermentation alfo, and fometimes without, reverts into grofs bodies. Quickfilver fometimes puts on the form of a fluid metal, fometimes it appears in fhape of a pellucid fragile falt, called fublimate; fometimes of a pellucid volatile white taftelefs earth, called mercurius dulcis; by diftillation it becomes vapour, and by agitation in vacuo, it fhines like fire, &c. See EARTH, MERCURY, &c.

All bodies, beafts, fifhes, infects, plants, &c. with all their various parts, grow and increafe out of water, and aqueous and faline tinctures; and by putrefaction, all of them revert into water or an aqueous liquor again. Farther, water expofed a while to the open air, puts on a tincture, which, in procefs of time, has a fediment and a fpirit, and before putrefaction, yields nourifhment both for animals and vegetables.

TRANSMUTATION, in alchemy, denotes the art of changing or exalting imperfect metals into gold or filver. This is alfo called the grand operation, and, they fay, is to be effected with the philofopher's ftone. See the article PHILOSOPHER'S STONE.

Some alchemifts hold, that the tranfmutation fhould rather be called the perfection of imperfect metals; as holding all metals intended by nature, to arrive equally at the perfection of gold, in as much as they are compofed of the fame matter; and that it is only the impurity of their matrices, that is, of the place wherein they are formed by nature, that has prevented their arriving thereat. The elixir being projected on any of thefe metals, it is fuppofed to purge and feparate the impure parts from the pure, and to join itfelf wholly to the mercury (which is the pureft part) as being of the fame nature.

Whether or no metals may be tranfmuted into one another, is a point ftrongly difputed among philofophers; the alchemifts ftrenuoufly afferting the affirmative. Some metals, it is commonly fuppofed, may be changed into others, *e. g.* iron into copper, and lead into tin; but Cardan, and fome others, deny even this, and argue farther, that though iron and brafs, as being nearly alike in weight and tenacity, &c. provided their colour and hardnefs could be changed, might be converted into one another, either really or at leaft apparently; yet would the tranfmuting or ripening of other metals into gold or filver, be ftill not lefs impoffible; both as thefe metals are all to be firft calcined, after which they can never again be brought back to their priftine purity, and as there is a generation required which is not the work of art but of nature. Cardan, Lemery, Dickenfon, and others, give us accounts of the various impoftures of adepti in the bufinefs of tranfmutation; fome, for inftance, fixing mercury with verdigreafe, and then heightening the colour with cadmia, &c. but this, if tried with the coppel, all goes off in fumes; and, in effect, nothing produced this way ought to be adjudged true gold, unlefs it endure copelling and cementation, purification with antimony, and the depart. Add, that it muft have the malleability, extreme ductility, and fpecific gravity of gold. See GOLD, &c.

TRANSMUTATION, in geometry, denotes the reduction or change of one figure or body into another of the fame area or folidity, but of a different form; as

as a triangle into a ſquare, a pyramid into a parallelopiped, &c. In the higher geometry, tranſmutation is uſed for the converting a figure into another of the ſame kind and order, whoſe reſpective parts riſe to the ſame dimenſions in an equation, admit of the ſame tangents, &c. If a rectilinear figure be tranſmuted into another, it is ſufficient that the interſections of the lines which compoſe it be transferred, and the lines drawn through the ſame in the new figure. If the figure to be tranſmuted be curvilinear, the points, tangents, and other right lines by means whereof the curve line is to be defined, muſt be transferred.

TRANSOM, among builders, denotes the piece that is framed acroſs a double light window. See the article WINDOW.

TRANSOM, among mathematicians, ſignifies the vane of a croſs-ſtaff, or a wooden number fixed acroſs, with a ſquare whereon it ſlides, &c. See CROSS-STAFF.

TRANSOM, in a ſhip, a piece of timber which lies athwart the ſtern, between the two faſhion-pieces, directly under the gun-room-port. See the article SHIP.

TRANSPARENCY, *diaphaneity*, in phyſics, a quality in certain bodies whereby they give paſſage to the rays of light, in contradiſtinction to opacity, or that quality of bodies which renders them impervious to the rays of light. For the doctrine of tranſparency, ſee OPACITY.

TRANSPIRATION, the inſenſible, or almoſt inſenſible, paſſage of an excrementitious matter through the pores of the ſkin, called alſo perſpiration. See the article PERSPIRATION.

TRANSPIRATION is alſo uſed by ſome authors for the ingreſs or entrance of the air, vapour, &c. through the pores of the ſkin into the body. Cardan, by this kind of tranſpiration, accounts for the prodigy of a woman whoſe daily urine weighed twenty-ſeven pounds, though all the food ſhe took, both dry and liquid, did not exceed four pounds. Dr. Baynard alſo ſuſpects ſome ſuch tranſpiration to be the caſe in hydropical perſons.

TRANSPLANTATION, in agriculture and gardening, the act of removing trees or plants from the places where they were ſowed, or raiſed, and planting them in others. See the article PLANTING.

TRANSPLANTATION, in natural magic, is uſed for a method of curing diſeaſes, by transferring them from one ſubject to another, which was much in vogue among certain chemical or rather ſympathetical phyſicians ſome years ago. A ſubject too whimſical to deſerve further notice.

TRANSPORTATION, the act of conveying or carrying a thing from one place to another.

Tranſportation is a kind of puniſhment, or more properly an alleviation or commutation of puniſhment, for criminals convicted of felony, who for the firſt offence, unleſs it be an extraordinary one, are generally tranſported to the plantations, there to bear hard labour for a term of years; within which, if they return, they are executed without farther trial.

TRANSPORTATION *of plants*. In ſending plants from one country to another, great cautions are neceſſary. The plants ſent from a hotter country to a colder, ſhould be always put on board in the ſpring of the year, that the heat of the ſeaſon may be advancing as they approach the colder climates; and, on the contrary, thoſe which are ſent from a colder country to a hotter, ſhould be ſent in the beginning of winter. The beſt way of packing up plants for a voyage, if they be ſuch as will not bear keeping out of the earth, is to have boxes with handles, filling them with earth, and planting the roots as cloſe together as may be; the plants ſhould be ſet in theſe boxes three weeks before they are to be put on board; and in good weather they ſhould be ſet upon the deck; and in bad removed or covered with a tarpaulin. If they are going from a hotter country to a colder one, they muſt have very little moiſture; if, on the contrary, they are going from a colder to a warmer, they may be allowed water more largely, and being ſhaded from the heat of the ſun, they will come ſafe.

A great many plants, however, will live out of the earth a conſiderable while; as the ſedums, euphorbiums, ficoides, and other ſucculent ones. Theſe need no other care than the packing them up with moſs in a cloſe box; and there ſhould be a little hay put between them, to prevent them from wounding or bruiſing one another, and holes bored in the boxes to keep them from heating and putrefying. In this manner they will come ſafe from a voyage of two or three, or even four or five months. Several trees alſo will come ſafe in the ſame manner; taking them up at a ſeaſon when they have done growing, and packing them up with moſs. Of this ſort

ſort are oranges, olives, capers, jaſmines, and pomegranate-trees. Theſe, and many others, are annually brought over to us from Italy; and, though they are three or four months in the paſſage, ſeldom miſcarry. The beſt way of ſending over ſeeds, is in their natural huſks, in a bag, or packed up in a gourd-ſhell, keeping them dry, and out of the way of vermin.

TRANSPOSITION, in algebra, the bringing any term of an equation over to the other ſide. See EQUATION.

TRANSPOSITION, in grammar, a diſturbing or diſlocating of the words in a diſcourſe, or a changing of their natural order of conſtruction, to pleaſe the ear by rendering the contexture more eaſy, ſmooth, and harmonious. A tranſpoſition which renders the ſenſe perplexed, is vicious. The conſtitution of the antient languages, being much more artful than that of the modern ones, allowed of much greater and more frequent tranſpoſitions. The Engliſh, French, *&c.* ſcarce ever allowed of them but in oratory, and poetry, in which caſes they ſerve to give a force and energy to the diſcourſe or the verſe, and to prevent their languiſhing.

TRANSPOSITION, in muſic, is a changing of the notes of a piece of muſic, or the ſhifting a ſong from its former ſituation, to ſet it either higher or lower, or in another octave.

Of this there are two kinds, the firſt is with reſpect to the clef, the ſecond with reſpect to the key. Tranſpoſition, with reſpect to the clef, conſiſts in the changing the places or ſeats of the notes or letters among the lines and ſpaces, but ſo as that every note is ſet at the ſame letter. This is done either by removing the ſame clef to another line, or by uſing another clef, but with the ſame ſignature, by reaſon the piece is in the ſame key. See the article CLEF.

The practice is eaſy in either caſe. In the firſt you take the firſt note at the ſame diſtance, either above or below the clef-note, in its new poſition, as before, and all the reſt of the notes in the ſame relations or diſtances from one another, ſo that the notes are all ſet on lines and ſpaces of the ſame name. In the ſecond, or ſetting of the muſic to a different clef, it is to be obſerved the places of the three clef-notes are invariable in the ſcale, and are to one another in theſe relations, the mean a fifth above the baſs, and the treble a fifth above the mean. Now to tranſpoſe a new clef, for example, from the treble to the mean, wherever the new clef is ſet, we ſuppoſe it the ſame individual note in the ſame place of the ſcale, as if the piece were that part in the compoſition to which the new clef is generally appropriated, ſo that it may direct to the ſame notes we had before tranſpoſition. Now from the fixed relations of the three clefs in the ſcale, it will be eaſy to find the ſeat of the firſt tranſpoſed note, and then all the reſt are to be ſet at the ſame mutual diſtances they were at before. See the article SCALE.

Suppoſe, for example, the firſt note of a ſong be *d*, a ſixth above the baſs clef; wherever that clef is placed, the firſt note muſt be a greater ſecond above it; becauſe a greater ſecond above the mean, is a greater ſixth above the baſs-clef, the relation between the two being a fifth: ſo that the firſt note will ſtill be the ſame individual note *d*. The uſe of this tranſpoſition is, that if a ſong be ſet with a certain clef in a certain poſition, the notes go far above or below the ſyſtem of five lines, they may, by the change of the place of the ſame clef in the particular ſyſtem, or by taking a new clef, be brought more within the compaſs of the lines.

Tranſpoſition from one key to another, is the changing of the key, or a ſetting all the notes of a ſong at different letters, and performing it conſequently in different places upon the inſtrument. See the article KEY.

The deſign hereof is, that a ſong which being begun in one place is too high, too low, or otherwiſe inconvenient for a certain inſtrument, may be begun in another place, and from that carried on through all its juſt degrees. The clef and its poſitions here remain the ſame, and the change is of the notes themſelves, from one letter, and its line or ſpace, to another. In the former tranſpoſition the notes were expreſſed by the ſame letters, but both removed to different lines and ſpaces; in this the letters are unmoved, and the notes of the ſong transferred to or expreſſed by other letters, and conſequently ſet upon different lines and ſpaces, which therefore requires a different ſignature of the clef.

TRANSUBSTANTIATION, *tranſubſtantiatio*, in theology, the converſion or change of the ſubſtance of the bread and wine in the euchariſt, into the body and blood of Jeſus Chriſt, which the romiſh

 church

church hold is wrought by the confecration of the prieft. This is a main point in the romifh religion, and is rejected by the proteftants, the former maintaining the tranfubftantiation to be real, the latter only figurative; interpreting the text *hoc eft corpus meum,* "this fignifies my "body:" but the council of Trent ftood up ftrenuoufly for the literal fenfe of the verb *eft*, and fay exprefsly, that in tranfubftantiation the body and blood of our Lord Jefus Chrift are truly, really, and fubftantially under the fpecies of bread and wine. The controverfies about this point, are almoft innumerable.

TRANSUMPTION, *tranfumptio*, in the fchools, a fyllogifm by conceffion or agreement, ufed where a queftion propofed is transferred to another; with this condition, that the proof of this latter fhould be admitted for a proof of the former. See the article SYLLOGISM.

TRANSVERSALIS, in anatomy, a name given to feveral mufcles, *&c.* in refpect to their fituation, progrefs, *&c.* as, 1. The tranfverfalis abdominis, a mufcle which lies under the obliqui, and arifes from the cartilago xiphoides, from the extremities of the falfe ribs, from the tranfverfe apophyfis of the vertebræ of the loins, is fixed to the innerfide of the fpine of the ileum, and inferted in the os pubis and the linea alba. This, with the obliqui, unites its tendons as it approaches the linea alba, and is the only mufcle that is cut in the operation of the bubonocele. It has a fine and thin membrane, that clofes exactly its ring or hole through which the veffels pafs. 2. Tranfverfalis colli, is faid to be a part of the longiffimus dorfi. It arifes from the os facrum, and from all the tranfverfe proceffes of the vertebræ of the loins, back and neck, except the two firft; and is inferted by fo many diftinct tendons into all the fuperior fpines. It moves the whole fpine obliquely backwards. 3. Tranfverfalis pedis placentini, comes from the bone of the metatarfus that fuftains the toe next the little toe, and paffing acrofs the other bones, is inferted into the os fefamoides of the toe. Its ufe is to bring all the toes clofe to one another. 4. Tranfverfalis penis, one of the dilators of the urethra, arifing from the tubercle of the os ifchium on each fide, and inferted into the pofterior part of the bulb of the urethra; however thefe mufcles are not quite determinate and certain in their origin or infertion, and fometimes they are wholly wanting: when they act, they dilate the urethra in its pofterior part. 5. Tranfverfalis is alfo a name given to a future of the cranium, becaufe of its traverfing or croffing the face from one fide to another. See SKULL.

TRANSVERSE, fomething that goes acrofs another, from corner to corner; thus bends and bars, in heraldry, are tranfverfe pieces or bearings: the diagonals of a parallelogram or a fquare, are tranfverfe lines: lines which make interfections with perpendiculars, are alfo called oblique or tranfverfe lines.

For the tranfverfe axis or diameter, called alfo the firft and principal axis, fee the articles AXIS, DIAMETER, LATUS TRANSVERSUM, ELLIPSIS, *&c.*

TRANSVERSE MUSCLES, in anatomy, are certain mufcles arifing from the tranfverfe proceffes of the vertebræ of the loins. See the article TRANSVERSALIS.

TRAPA, in botany, a genus of the tetrandria monogynia clafs of plants, the corolla whereof confifts of four petals, vertically ovated, and larger than the cup; the fruit is a hard offeous capfule, of an oblong oval figure, containing only one cell, and armed with four fharp, thick fpines, placed oppofitely in the middle of the fides, and pointed; thefe before were the leaves of the calyx: the feed is a covered fingle nucleus, of an oval figure.

TRAPANO, a city and port-town of Sicily, fituated on the moft weftern parts of the ifland, in eaft long. 12° 8′, north lat. 38°.

TRAPEZIUM, in geometry, a plane figure contained under four unequal right lines. 1. Any three fides of a trapezium taken together, are greater than the third. 2. The two diagonals of any trapezium, divide it into four proportional triangles. 3. If two fides of a trapezium be parallel, the rectangle under the aggregate of the parallel fides and one half their diftance is equal to that trapezium. 4. If a parallelogram circumfcribes a trapezium, fo that one of the fides of the parallelogram be parallel to a diagonal of the trapezium, that parallelogram will be the double of the trapezium. 5. If any trapezium has two of its oppofite angles, each a right angle, and a diagonal be drawn joining thefe angles; and if from the other two angles be drawn two perpendiculars to that diagonal, the diftances from the feet of thefe perpendiculars to thofe right angles, refpectively taken, will be equal. 6. If the fides of a trapezium be each biffected, and

and the points of biſſection be joined by four right lines, theſe lines will form a parallelogram, which will be one half of the trapezium. 7. If the diagonals of a trapezium be biſſected, and a right line joins theſe points, the aggregate of the ſquares of the ſides is equal to the aggregate of the ſquares of the diagonals, together with four times of the ſquare of the right line joining the point of biſſection. 8. In any trapezium, the aggregate of the diagonals is leſs than the aggregate of four right lines drawn from any point (except the interſection of the diagonals) within the figure.

TRAPEZIUS, in anatomy. See the article CUCULARIS.

TRAPEZOID, is a ſolid irregular figure, having four ſides not parallel to one another.

TRAPEZOND, or TREBISOND, a city and port-town of aſiatic Turky, in the province of Amaſia, ſituated on the Black-ſea; eaſt long. 42° 20′, north lat. 42° 26′.

TRAVE, a river of Germany, in the circle of Lower Saxony and dutchy of Holſtein, which runs from weſt to eaſt by Lubeck, and falls into the Baltic at Travemund.

TRAVEMUND, a port-town of the dutchy of Holſtein, ſituated on the Baltic-ſea, at the mouth of the river Trave: eaſt long. 10° 45′, north lat. 54° 30′.

TRAVERSE, or TRANSVERSE, in general, denotes ſomething that goes athwart another; that is, croſſes and cuts it obliquely.

Hence, to traverſe a piece of ordnance, among gunners, ſignifies to turn or point it which way one pleaſes, upon the platform.

In fortification, traverſe denotes a trench with a little parapet, or bank of earth, thrown perpendicularly acroſs the moat, or other work, to prevent the enemy's cannon from raking it. Theſe traverſes may be from twelve to eighteen feet, in order to be cannon proof, and their height about ſix or ſeven feet, or more, if the place be expoſed to any eminence. And to preſerve a communication, a paſſage of about five or ſix feet wide muſt be left at one end of the traverſe. The different ways of conſtructing theſe works, are repreſented in plate CCLXXXI. fig. 2. n° 1, 2, 3 and 4.

If any part of a work, thus ſhut in by one or more traverſes, is likely to be defended by the muſketry, it will be proper to add to the traverſes one or more foot-banks within the defence, for the troops to mount on, when they want to fire over the traverſe.

TRAVERSE, in navigation, is a compound courſe, wherein ſeveral different ſucceſſive courſes and diſtances are known.

To work a traverſe, or to reduce a compound courſe to a ſingle one, 1. Make a table of ſix columns, marked courſe, diſtance, N. S. E. W. beginning at the left hand, and write the given courſes and diſtances in their proper columns. 2. Seek the given courſes and diſtances in the traverſe table, and let the correſponding differences of latitude and departure be wrote in their proper columns in the table made for the queſtion. 3. Add up the columns of northing, ſouthing, eaſting, and weſting; then the difference between the ſums of northing and ſouthing, gives the whole difference of latitude, which is of the ſame name with the greater; and the difference between the ſums of eaſting and weſting will be the whole departure, which is likewiſe of the ſame name with the greater. 4. The whole diff. lat. and depart. to the compound courſe being found, the direct courſe and diſtance will be found by Caſe IV. of plain-ſailing. See the article NAVIGATION.

Example: Suppoſe a ſhip, in the latitude of 4° 10′ north lat. 3° 39′ E. long. ſails S. 11° W. 91 miles, S. W. 120 miles, W. N. W. 130 miles, S. E. 135 miles, S. E. by E. 130 miles, and S. W. by S. 150 miles; required the direct courſe and diſtance ſailed, and the latitude and longitude the ſhip is in?

Geometrically: draw the meridian line $px$ (plate XL. fig. 5.) and make the angle $qp2$ equal to 11° 15′ = 1 point, and draw the right line $qp$, making it equal to 88 miles, the firſt diſtance ſailed; and let fall the perpendicular $q2$; then will $q$ be the place of the ſhip, $p2$ the difference of latitude, and $q2$ the departure belonging to the firſt courſe: and after the ſame manner muſt the triangles $q3r$, $rs4$, $4t5$, $5u6$, and $67w$, be projected; then will $w$ be the place of the ſhip at the end of her ſailing, $px$ the difference of latitude, $wx$ the departure, the angle $xpw$ her direct courſe from her firſt to her laſt ſtation, and $pw$ her direct diſtance; which may be all meaſured by the inſtructions given under the article NAVIGATION.

Arithmetically: the arithmetical ſolution of

of this problem depends entirely on the firft and fourth cafes of *Plane* SAILING; for firft the correfponding difference of latitude and departure muft be found to each courfe and diftance, as in the firft cafe, and placed in a table according to their feveral directions: that is, when the fhip fails to the northward, the difference of latitude muft be placed in the north column, but, when to the fouthward, in the fouth column; and the departure, if fhe fails to the weftward, in the weft column, but, if to the eaftward, in the eaft column. Then will the totals of the feveral columns fhew the northings, fouthings, eaftings, and weftings the fhip has made. And, confequently, if the fouthings exceed the northings, the fhip will be to the fouthward of her firft ftation, and juft as much as is the excefs, and *vice verfa*; in like manner, if the eaftings exceed the weftings, the fhip will be to the eaftward of her firft meridian, but, if the contrary, to the weftward. Then we fhall have the whole difference of latitude and departure from the meridian given, to find the courfe and diftance, as in the fourth cafe. See the following table.

| Courfes. | Diftances. | Diff. of lat. Northings. | Diff. of lat. Southings. | Departure. Eaftings. | Departure. Weftings. |
|---|---|---|---|---|---|
| S. 11° W. | 91 | | 89,3 | | 17,2 |
| S. W. | 120 | | 84,8 | | 84,8 |
| W. N. W. | 130 | 49,8 | | | 120,1 |
| S. E. | 135 | | 95,4 | 95,4 | |
| S. E. by E. | 130 | | 73,3 | 108,0 | |
| S. W. by S. | 150 | | 124,7 | | 83,4 |
| | | 49,8 | 467,5 | 203,4 | 305,5 |
| | | | 49,8 | | 203,4 |
| | | dif. la | 417,7 | depa. | 102,1 |

Hence it appears, that the fhip is 417,7 miles to the fouthward of her firft ftation, and 102,1 miles to the weftward of her firft meridian; whence we may, by the fourth cafe of plane failing, find her direct courfe and diftance, as follows:

1. As the difference of latitude $px = 417,7 =$ } 2.6208645
Is to the radius $= 90^\circ\ 00' =$ 10.0000000
So is the departure $wx = 102,1 =$ - - - } 2.0090257
To the T. of the courfe or angle $wpx = 13^\circ\ 44' =$ } 9.3881612

Which is fouth 13° 44′ wefterly, or fomething more than fouth by weft, becaufe the difference of latitude is foutherly, and the departure wefterly.

2. As the fine of the courfe $= 13^\circ\ 44' =$ - } 9,3760034
Is to the departure $= 102,1 =$ 2,0090257
So is the radius $= 90^\circ\ 00' =$ 10,0000000
To the diftance $= 429,6 =$ 2.6330223

And, becaufe the difference of latitude exceeds the latitude failed from, d. m.
Therefore, from the difference of lat. $= 417,7 =$ } 6 : 57,7
Take the lat. failed from $=$ 4 : 10N.
Remains the lat. the fhip is in $=$ 2 : 47,7S.

And, becaufe the difference of longitude is wefterly, therefore, d. m.
From the long. failed from $=$ 3 : 39E.
Take the difference of longitude $= 102,1 =$ } 1 : 42,1W.
Remains the long. the fhip is in $=$ - - - } 1 : 47,9E.

Hence it appears, that the fhip is arrived in the latitude of 2° 47,7′ = 2° 47′ 42″ fouth, and 1° 47,9′ = 1° 47′ 54″ eaft longitude; her direct courfe from her firft to her laft ftation being fouth, 13° 44′ wefterly, diftant 429,6 miles.

TRAVERSE, in law, denotes the denial of fome matter of fact alledged to be done in a declaration, or pleadings; upon which the other fide coming and maintaining that it was done, iffue is joined for the caufe to proceed to trial.

TRAVERSE *of an indictment*, or *prefentment*, is the contradicting or denying fome chief point of it, and taking iffue thereon.

TRAVERSE *of an office*, is the proving that an inquifition made by lands or goods, is defective and untruly made.

TRAVERSE is fometimes alfo ufed, in heraldry, for a partition of an efcutcheon, of figure reprefented in pl. CCLXXXI. fig. 4. which is blazoned parti per pal traverfe, argent and gules.

TRAVESTY, or TRAVESTI, a french term, derived from the verb *traveftir*, to difguife one's felf, or to appear in mafquerade: and hence, travefty is applied to the disfiguring of an author, or the tranflating him into a ftyle and manner different from his own, by which means it becomes difficult to know him.

TRAUMATICS, the fame with vulnerary medicines. See VULNERARY.

TRAW, a port-town of Dalmatia, fituated on the gulph of Venice, in eaft long. 17° 30′, and north lat. 43° 10′.

TRAYGNERA, a town of Valencia, in Spain,

Spain, near the confines of Catalonia: west long. 15′, and north lat. 40° 32′.

TREACLE, *theriaca*, in pharmacy. See the article THERIACA.

Some also give the name treacle to melasses; and in this sense it is that Dr. Shaw, in his Essay on distillery, has endeavoured to bring into use several sorts of treacles, which might be made at home, and would serve very conveniently for the distillation of spirits, or the making of potable liquors. These are the inspissated juices or decoctions of vegetables: such as the sweet juice of the birch, or sycamore, procured by tapping or piercing the trees in spring, and the common wort made from malt, or from other vegetable substances treated in the same manner. These liquors are severally to be boiled down in a copper till they begin to inspissate, and then to be poured into a balneum mariæ, when the remainder of the evaporation may be finished without burning the inspissated juices: thus prepared it may be at any time reduced to the state of wort, only by adding a sufficient quantity of warm water. See the article TAPPING.

TREASON, in general, signifies betraying; but is more particularly used for the act or crime of infidelity to one's lawful sovereign.

Treason is divided, by lawyers, into high treason, and petty treason. The first of these is an offence committed against the security of the king or kingdom; as to compass, or imagine, the death of the king, queen, or their eldest son and heir; or in case a person does violate or deflower the king's wife, or his eldest daughter unmarried, or the wife of the king's eldest son; or if he levy war against the king within his kingdom, or adhere to his enemies, give them aid or comfort within the realm, or elsewhere; or if he counterfeit the king's great or privy seal, or his money, or bring false money into the kingdom, like to what we have here, and utter the same; if he kill the chancellor, treasurer, justices of either bench, justices of assize, or of oyer and terminer, sitting in judgment and representing the person of the king, in the execution of his office: all these cases are deemed treason by 25 Ed. III. c. 2. which statute is made the only standard of high-treason; and 1 Mary c. 1. takes away the power of the king and parliament to adjudge any thing else to be high-treason but what is declared to be such therein: it is true, temporary statutes of late times enacted, have made some other offences treason, as relating to papists and the protestant succession.

It has been held, that words only, where they are deliberate, and shew a direct purpose against the king's life, will amount to an overt-act of compassing or imagining his death, and are high-treason: for words are the most natural way of expressing the imagination of the heart, and may be good evidence of it: not only words of perswasion to kill the king, but such as are spoken in order to draw away the affections of his people, and to stir them up against him, are tending to the king's death, and therefore treason. Likewise where a person intends by force to prescribe laws to the king, or to restrain him of his royal power, it has been adjudged an intention to deprive him of his crown and life; and in the eye of the law, every rebellion is a treasonable plot against the life of the king, for a rebel would not suffer that king to live and reign, who would punish his offence.

As to make a crime treason, there must be always some overt-act; a bare conspiracy, or compassing to levy war, is no such act, unless it be really levied; in which case the conspirators are all traitors, although they are not in arms: persons that raise forces for any public end or purpose, or who make an insurrection on any account, are said to levy war against the king, though perhaps without a direct design against his person; and it extends to the case where great numbers forcibly endeavour to remove certain persons from the king, &c. The adhering to the king's enemies, is taken to be an adherence against him, and even out of the realm it is treason: and it is said, that cruising in a ship of war with an intent to destroy the king's ships, though no act of hostility be committed, is an overt-act of adhering, comforting and aiding.

All trials for high-treason are to be according to the course of the common law; and persons indicted for this crime, are to have a copy of the indictment five days before their trial, that they may have sufficient time to advise with council; they shall likewise be permitted to make a full defence by their council learned in the law, and by lawful witnesses, &c. And in this case there must be

be two evidences to the same overt-act, or to two acts of the same treason, produced face to face against them. It is also said, where a person is convicted of treason, the omission of any necessary part of the judgment will be held to be error, on which he may reverse the attainder; as the judgment is severer, and more formidable, in case of high-treason than for any other crime whatever; since the offender is to be hanged, drawn, and quartered, and also forfeit his lands and goods to the king.

Petty-treason, is where a servant kills his master, a wife her husband, or a secular or religious person kills his prelate or superior, to whom he owes faith and obedience; and aiders and abettors, as well as procurers, are within the act. However, so strictly is the statute construed, that no case not expressly mentioned therein is punishable by it: hence if a son kill his father, he shall not be tried for petty treason, except he served his father for wages, in which case he is to be indicted under the name of a servant.

Petty-treason implies the highest degree of murder, and occasions the forfeiture of lands by escheat to the lord of the fee; and the further punishment of the criminal is to be hanged, drawn, and quartered for it, and a woman burnt.

TREASURE, in general, denotes a store or stock of money in reserve. See the article MONEY.

Treasure trove, in law, is where any treasure is found buried in the earth, but not lying on the ground, and no man knows to whom it belongs: this, in England, belongs to the king, and to conceal it is punishable by fine and imprisonment.

TREASURER, an officer to whom the treasure of a prince, or corporation, is committed to be kept, and duly disposed of.

The lord high treasurer of Great Britain, or first commissioner of the treasury, when in commission, has under his charge and government all the king's revenue, which is kept in the exchequer. He holds his place during the king's pleasure, being instituted by the delivery of a white staff to him: he has the check of all the officers employed in collecting the customs and other royal revenues; and in his gift and disposition are all the offices of the customs in the several ports of the kingdom; escheators in every county are nominated by him; he also makes leases of the lands belonging to the crown.

There is, besides the lord treasurer, a treasurer of the king's houshold, who is of the privy council, and, with the comptroller and steward of the marshalsea, has great power.

To these may be added the treasurer of the navy; as also the treasurer of the king's chamber, and of the wardrobe; and most corporations throughout the kingdom have treasurers, whose office is to receive their rents, and disburse their common expences.

The treasurer of the county, is an officer that keeps the county-stock, in which office there are two in every county; who are chosen by the major part of the justices of the peace at Easter-sessions. They ought to have certain estates in lands, or to be worth 150l. in personal estate, and are to continue in their office only for a year, at the end whereof, or within ten days after the expiration of the year, they must account to their successors, under certain penalties. The county-stock which this officer has the keeping of, is raised by rating every parish annually; and the same is from time to time disposed of to charitable uses, towards the relief of maimed soldiers and mariners, prisoners in the county gaols, paying the salaries of governors of houses of correction, and relieving poor alms-houses, &c.

TREASURY, the place wherein the revenues of a prince are received, preserved, and disbursed.

In England, the treasury is part of the exchequer, by some called the lower exchequer. See the article EXCHEQUER.

*Lords of the* TREASURY. In lieu of one single director and administrator of his majesty's revenues under the title of lord high treasurer, it is at present thought proper to put that office in commission, *i. e.* to appoint several persons to discharge it with equal authority, under the title of lords commissioners of the treasury.

TREATISE, *tractatus*, a set discourse in writing on any subject. A treatise is supposed more express, formal, and methodical than an essay, but less so than a system.

TREATY, a covenant between two or more nations; or the several articles or conditions stipulated and agreed upon between sovereign powers.

Treaties are of various kinds; as treaties of peace, of alliance, of commerce, &c.

&c. for the guaranty of which, see the article GUARANTY.

TREBIGNA, a town of european Turky, in the province of Dalmatia, near the gulph of Venice: east long. 19°, north lat. 42° 40′.

TREBLE, in music, the highest or acutest of the four parts in symphony, or that which is heard the clearest and shrillest in a concert. See the article CLEF.

TREE, *arbor*, the first and largest of the vegetable kind, consisting of a single trunk, out of which spring forth branches and leaves.

Standard-trees are such as naturally rise to a great height, and are not topped. For the choice of trees of this kind to be transplanted out of a nursery, Quintiney recommends us to such as are straight, six feet high at least, and five or six inches thick at bottom, and three or four at top; the bark pretty smooth and shining, as a token of their youth, and of the good soil they grew in.

Dwarf-trees are such as are kept low, and never suffered to have above half a foot or stem. See the article DWARF.

*Fruit*-TREES. See the article FRUIT.

For the planting, pruning, felling, grafting, &c. of trees, see the articles PLANTING, PRUNING, &c.

TREFOIL, *trifolium*, in botany, a genus of the diadelphia-decandria class of plants, with a papilionaceous flower: its fruit is a short univalve pod, or capsule, containing a few roundish seeds.

Trefoil, or clover, is a plant greatly esteemed by the english farmers, for the great improvement it makes upon land, the goodness of its hay, and the value of its seed. The great advantage of clover, or trefoil, to the land on which it grows is, that it feeds a vast number of cattle at a time; and their dung is so rich a manure to the ground, that in two or three years time it becomes fit for corn again, though it had been ever so much exhausted before. Clayey lands, in particular, are greatly improved by it.

There are several kinds of clover, but the great sort is esteemed the best, whose seed is like that of mustard, except that it is more oblong. The english seed is preferable to that of all other places, and the farmer should choose such as is of a greenish colour, with a cast of red; that which is black never growing so well. An acre of land will require ten pounds of seed, sometimes twelve pounds, and it is better to sow too much than too little. It delights most in a rich warm soil, and always thrives best in those lands which have been well dunged or manured; but the clay-lands, which are long in acquiring a coat of grass, or swarding, as the farmers express it, and are little subject to weeds, are of all other the best land for clover; because in those lands, where the common grass grows speedily, it soon eats out the clover.

*Marsh*-TREFOIL, *trifolium palustre*, in botany, &c. the same with the menyanthes or buck-bean. See MENYANTHES.

*Shrub*-TREFOIL, *cytisus*, in botany. See the article CYTISUS.

TREFURT, a town of Upper Saxony, twenty-two miles west of Saxe-Gotha.

TREGONY, a borough of Cornwal, forty miles south-west of Launceston.

It sends two members to parliament.

TREILEBOURG, a port town of Schonen, in Sweden, situated on the Baltic-sea, thirty miles south-east of Copenhagen.

TREMELLA, LAVER, in botany, a genus of sea-plants, of a middle nature, between the alga and conferva, being of a pellucid and membranaceous, and frequently of a gelatinous structure.

TREMOR, or TREMBLING *of the joints*, in medicine, is an involuntary shaking, chiefly of the hands and head, sometimes of the feet, and sometimes of the tongue and heart. It is a disorder which frequently attacks persons advanced in years, and sometimes the younger sort. It seems to arise from a defect of spirits, sometimes from terror, or other violent passion, and sometimes from a plethora. Too much drinking of coffee also produces a tremor in some persons, as too plentiful drinking and surfeits will in others.

Tremors are often dangerous, as being apt to degenerate into other nervous distempers; as spasms, the palsy, lethargy, apoplexy, &c.

In the cure, those things should be avoided that promote the disease, and the patient should drink balm or sage-tea, or a diet-drink made of china-root; peruvian bark may also be taken, in an infusion of balm or sage, or succinated spirit of hart's horn, twice or thrice in a day; and in the evening an antispasmodic powder may be taken, especially if the patient is hot, or uses much wine. Outwardly, the neck and spine of the back may be rubbed with the spirits of ants, earth-worms, and sal ammoniac, mixed

mixed together; a fourth part of the volatile fpirits will be fufficient, or opodeldoc may be ufed in their ftead. If the patient is plethoric, bleeding is ufeful; and in old perfons, a draught of generous wine at meals: pediluvia, hot-baths, and mineral-waters, may alfo be ufed, but with caution.

As to the medicine commonly ufed in tremors and other nervous diftempers, under the name of palfy-drops, it is no other than compound fpirit of lavender; the moft fuccefsful way of ufing which is, by taking thirty or forty drops twice or thrice a day, dropped on loaf-fugar or a little bread. It is fuppofed that by this way the moft fpirituous and efficacious parts make their way directly by the nerves of the palate, &c. without undergoing the courfe of the circulation, as it is faid to do when taken in a liquid vehicle.

TRENCHES, in fortification, are ditches cut by the befiegers, that they may approach more fecurely to the place attacked; whence they are alfo called lines of approach. The tail of the trench is the place where it was begun, and its head is the place where it ends.

The trenches are ufually opened, or begun, in the night time; fometimes within mufket fhot, and fometimes within half or whole cannon-fhot of the place. They are carried on in winding-lines, nearly parallel to the works of the fortrefs, fo as not to be in the view of the enemy, nor expofed to the enemy's fhot. The workmen employed in the trenches are always fupported by a number of troops, to defend them againft the fallies of the befieged: the pioneers fometimes work on their knees, and are ufually covered with mantlets or fauciffons; and the men who fupport them lie flat on their faces, in order to avoid the enemy's fhot.

TRENCHE, or TRANCHE', in heraldry. See the article TRANCHE'.

TRENT BISHOPRIC, a province of Germany, in the circle of Auftria, fituated on the Alps, which divides Italy from Germany, and fometimes reckoned part of Italy; it is bounded by Tyrol on the north, by the territory of Venice on the eaft and fouth, and by the country of the Grifons on the weft, being feventy miles long and fifty broad, fubject to the houfe of Auftria. Trent city, the capital of this bifhopric, is fituated in eaft long. 11°, north lat. 56° 5'. Here the famous council of Trent was held, which continued, with fome intermiffions, from the year 1545 to the year 1563, where the doctrine of the pope's infallibility, tranfubftantiation, &c. were confirmed.

TRENT is alfo the name of one of the largeft rivers in Great Britain, rifing in the moor-lands of Staffordfhire, and running fouth-eaft by Newcaftle Under Line, divides that country almoft into two equal parts; then entering Darbyfhire, turns about to the north-eaft; and having run the whole length of Nottinghamfhire, continues its courfe due north, at laft joining the river Oufe, and feveral others, it changes its name to that of Humber, and falls into the German-fea below Hull.

TRENTAL, or TRIGINTAL, a romifh office for the dead, confifting of thirty maffes rehearfed for thirty days fucceffively after the party's death. See the article MASS.

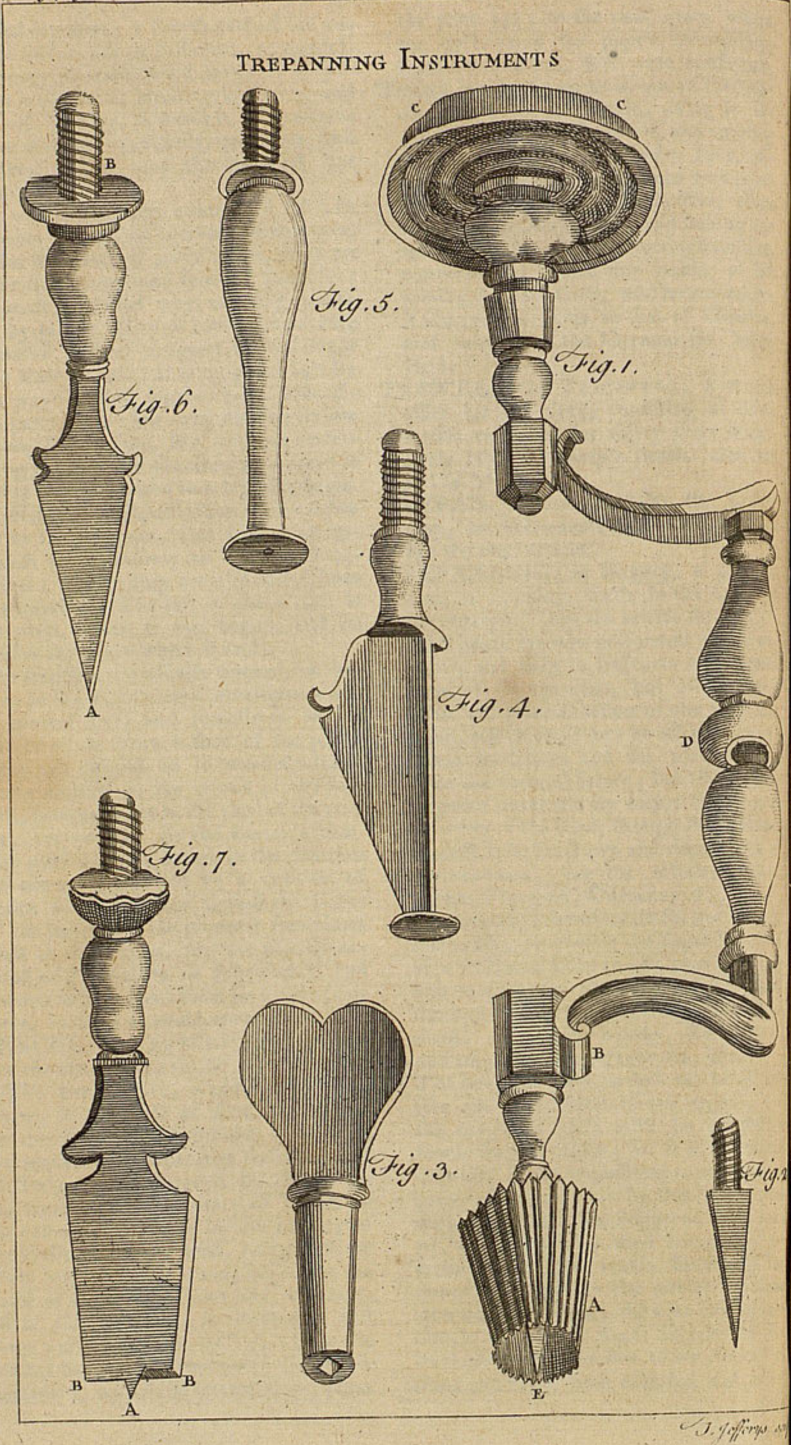
TREPAN, *terebra, modiolus, &c.* in furgery, an inftrument ufed in trepanning. See the next article.

TREPANNING, in furgery, a perforation, or opening, made in the bones of the cranium. See the article SKULL.

This operation was performed by the antients, not only in fractures and depreffions of the cranium, but alfo in thofe other obftinate diforders of the head and brain, which could not be relieved by internal medicines and the ufe of iffues upon the coronal future; but the modern furgeons never ufe the trepan for internal diforders of the head, though they feldom neglect it in fractures and depreffions of the cranium. See the articles FRACTURE, FISSURE, DEPRESSION, &c.

The trepan is therefore ufeful not only in thefe cafes, to elevate the depreffed parts of a fractured bone in the cranium, but alfo to difcharge the extravafated blood through an aperture made by this inftrument. See CONTUSION, EXTRAVASATION, CONTRA-FISSURE, &c.

The lefs time there is loft the better before the application of the trepan, but the operation itfelf muft be conducted flowly and carefully; for it is extremely difficult, if not impoffible, to take out a piece of the cranium by this inftrument without injuring the fubjacent dura mater, to which it is moft intimately attached. For this reafon Heifter is induced to condemn the advice of thofe who direct to trepan the cranium immediately upon every flight diforder of it: he therefore advifes firft to try the ufe of other remedies, both external and internal,


Trepanning Instruments
Fig. 1.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
A
B
C
D
E
J. Jefferys sc.

nal, rather than immediately subject the patient to the trepan, before it is absolutely necessary. In general, the place where the fissure appears will be the most convenient to apply the trepan, if nothing indicates the contrary; but in fractures it will be proper to trepan a little below the injured part, that the extravasated blood may be more easily discharged. It must be next observed, that there are several places in the cranium which ought not to be in any case trepanned; such as, 1. upon the sutures, especially the sagittal suture; yet in cases of urgent necessity, the trepan may be used upon the coronal sutures, and sometimes upon the others. 2. It is equally dangerous to trepan the cranium in the middle of the os frontis, especially in that part which forms the fontanel. 3. The trepan must not be used upon any of the sinuses of the os frontis. 4. Nor ought it to be used where any large vein or artery spreads itself. 5. If the fractured part of the bone upon which you fix the trepan is loose, or carious, you might then injure the brain by this instrument. 6. It will be improper to trepan in the lower parts, or basis, of the cranium, which are invested with muscles. 7. Lastly, it will be improper to trepan upon the cruciform eminence of the os occipitale. Notwithstanding these cautions, if a violent fracture should happen in or near these parts, you should trepan as near them as possible; and if the fracture has passed across the sutures, you must trepan within a finger's breadth of the suture on each side. Sometimes it is impossible to discover the particular part of the cranium which is injured, the patient in the mean time being affected with the most dangerous and urgent symptoms. In these cases it will be necessary to trepan first on the right side, then on the left, afterwards upon the forehead, and lastly upon the occiput, and so round till you meet with the seat of the disorder.

After having pitched upon the part to be trepanned, your next business is to shave the scalp, and make an incision through the integuments to lay bare the cranium, except it be done already by the wound. The incision of the integuments may be made in the form of a cross, or of the letters X, V, or T, large enough to admit the crown of the trepan upon the bone. The wound may be enlarged, and the hæmorrhage stopped, after the integuments and periosteum are separated and elevated from the cranium, by inserting a large quantity of scraped lint. Next a compress dipped in warm camphorated spirit of wine must be applied and retained by the kerchief bandage. Then the patient is to be left, if the disorder will permit, for a few hours, that the blood may be stopped before the trepan is applied. Among the apparatus, or instruments and dressings, which must be provided before the operation is entered upon, the first and principal is the trepan with its crown, (plate CCLXXXII. fig. 1.) made in the shape of a common gimblet with a handle turning round. The crown of this instrument, marked A, is joined to the lower part of the handle, B, by a screw, so that it may be taken off and put on at pleasure, or else that a crown of another size may be screwed in its place. The trepan is distinguished into male and female; in the first of which the crown is furnished with a sharp point E, but when the said point, or pyramid, fig. 2. is taken out by the winch, fig. 3. the trepan is then termed female. You must also be provided with a scalpel of a particular make, with a round and flat head, as represented in fig. 4. which is denominated the lenticular scapel; to which is added another instrument for gradually depressing the dura mater, of the shape represented in fig. 5. There must be also a perforating instrument provided, fig. 6. which must be screwed into the cavity B of the handle, fig. 1. also a hair-brush and an elevatory. See the article Elevatory.

The apparatus of dressing and bandage, to be applied after the operation, consists of a dossil of lint, of an orbicular figure, which must be tied round the middle with a piece of thread about a span long; there must be pledgits of lint for covering the other dressings, and filling up the cavity of the cranium, &c.

The apparatus being thus provided, in order to perform the operation with greater readiness and exactness, the patient must be disposed in such a convenient posture that the surgeon and assistants may have free access to perform each their part. Then the dressings being removed, the wound is to be cleansed; after which, the head being placed in a convenient manner upon a pillow, the surgeon takes the perforating trepan, fig. 6. and adapting it to the handle B, fig. 1. instead of the crown A, so that

 by

by turning round the handle D, he makes a full entrance, or aperture, with his inſtrument, and then applies the male trepan, with a crown A, fig. 1. Upon the top of the handle C C, the ſurgeon fixes his left hand, upon which he places his chin or forehead, while with his right he ſlowly and carefully turns round the handle till the crown of the trepan with its ſpindle have made a circular entrance deep enough in the cranium, and then he removes the ſpindle, and continues his work with the crown of the trepan only as long as he ſees convenient; all the ſaw-duſt being firſt bruſhed off from the cranium, and the teeth of his inſtrument, with the bruſhes. He now continues to uſe the trepan till the ſaw-duſt becomes bloody, which denotes that he has penetrated the diploë: however, he may not always meet with this ſign, becauſe in ſome ſkulls the diploë may be wanting in the part trepanned; but when the ſaw-duſt becomes bloody the inſtrument is to be laid aſide: and after waſhing away the blood with a ſponge dipt in ſpirit of wine, he then ſcrews the elevatory, by two or three turns, into the ſmall aperture in the middle of the trepanned piece of the bone, and takes it out again, making two or three more turns with the crown of his trepan: then he examines with a probe, whether the plates of the cranium are ſufficiently ſawed through, which cannot be better known than by attending to the colour of the circular groove; for when that appears blue or grey, it is a ſign that you have penetrated through the lower plate of the bone, ſo far as to render the dura mater almoſt conſpicuous through it; but if the bony plate appears livid in one part of the circular groove, and white in another, it is a ſign that the trepan has not cut equally through, and therefore it muſt be inclined and preſſed a little harder upon the whiteſt parts, moving round the handle till the ſaw-teeth of the crown have cut deep enough to make the round piece of the bone looſe or moveable. In that caſe it will not be convenient to cut totally through the bone with the ſaw-teeth of the trepan.

Having thus extracted the round piece of the cranium, the blood uſually follows it: which being wiped off, the ſurgeon is to examine whether there be any fragments remaining to be extracted and looſened; for then you muſt ſmooth the rough parts about the lower margin of the aperture, by applying the ſcalpel, fig. 4. to prevent the dura mater from being pricked and injured by any of the ſharp ſplinters. This done, the blood will more readily diſcharge itſelf, but to promote its exit you may gently incline the patient's head to one ſide, and another tenderly preſſing the dura mater itſelf, either by the hand of the ſcalpel, or the depreſſor, fig. 5, by which means the patient is no ſooner relieved from the preſſure of the extravaſated blood on his brain, but he inſtantly begins to recover his ſenſes: the ſurgeon ſhould then direct him to fetch a deep breath, or hold it with a ſtrain, like one that has a hard ſtool.

The dreſſings and deligation are to be made with a round pledgit of dry lint laid next the dura mater, with a thread faſtened to it, and hanging out of the aperture, that it may be placed under, and drawn out from beneath, the cranium; upon which pledgit is afterwards poured ſome honey of roſes diluted with a little ſpirit of wine: you then impoſe a like pledgit of lint, furniſhed with a ſtring with other doſſils, till the cavity is replete: and, in the next place, the cranium, and wound itſelf, is to be dreſſed with lint, ſpread with ſome digeſtive ointment, upon which add a ſquare compreſs dipt in warm ſpirit of wine, and then ſecure the whole, without a plaſter, by the head bandage. In the ſubſequent dreſſings, which muſt be repeated once or twice every day, you muſt avoid fat and oily applications. See Wound.

The wound being conſtantly attended, you will have an exfoliation of a thin plate from the trepanned margin of the bones, uſually within forty or fifty days, which ought not to be pulled away by force. The exfoliation being obtained, there will appear new fleſh and callus ſhooting up from the clean bone and dura mater, ſo as at length to fill up the whole cavity.

That inſtrument called the exfoliating-trepan, is ſometimes uſed to pare away a carious part in a bone. It is repreſented in fig. 7, and when uſed is to be ſcrewed into the handle B of fig. 1, in order to be turned round: A is its point: B B the wings, which ſcrape the bone while the inſtrument is turning about. See the article Caries.

TREPIDATION, in medicine, the ſame with tremor. See the article Tremor.

Trepidation, in the antient aſtronomy, denotes

denotes what they called a libration of the eighth ſphere, or a motion which the ptolemaic ſyſtem attributed to the firmament, to account for certain almoſt inſenſible changes and motions obſerved in the axis of the world, by means whereof the latitudes of the fixed ſtars come to be gradually changed, and the ecliptic ſeems to approach reciprocally firſt towards one pole, then towards the other. This motion is called the motion of the firſt libration. See the articles LIBRATION and TITUBATION.

TRESPASS, in law, ſignifies any tranſgreſſion of the law, under treaſon, felony, or miſpriſion of either; but it is moſt commonly uſed for any wrong or damage that is done by one private perſon to another, or to the king in his foreſt, &c.

In this ſenſe, treſpaſs is of two ſorts: treſpaſs general, which is called treſpaſs *vi et armis*; and treſpaſs ſpecial, or treſpaſs upon the caſe. Treſpaſſes againſt a man's perſon are ſuch as theſe, *viz.* threatening to hurt him, on aſſaulting or ſetting one to beat him; a battery, which is an actual beating or maiming a man ſo that he loſe the uſe of his limbs; an unlawful impriſonment of another, or illegally reſtraining him of his liberty, &c. See ASSAULT, BATTERY, &c.

Treſpaſſes committed againſt a man's property may be in ſeveral ways, as againſt his wife, children, or ſervants, or his houſe and goods, &c. or againſt his lands, by carrying away the deeds, or other evidences, concerning the ſame; cutting trees, or damaging the graſs therein. An action of treſpaſs, *vi et armis*, lies for a perſon who has the poſſeſſion of goods, or of a houſe, or land, if he be diſturbed in his poſſeſſion, for this reaſon, that ſuch diſturbance, beſides the private damage, is alſo a breach of the peace; and in caſe the defendant be convicted at common law, he is liable to be fined and impriſoned. The difference between this action and treſpaſs on the caſe is, that the one lies where the original act was a wrong in itſelf, and the other where it is conſequential to a lawful act. A defendant in treſpaſs ſhall in no caſe be excuſed, unleſs it be upon an unavoidable neceſſity; therefore, where there is only a force in law, as if a perſon enters into another's land, he muſt be requeſted to go out before hands are laid on him, but it is otherwiſe when there is an actual force committed. The defendant in treſpaſs can, by his plea, put the plaintiff to a new aſſignment of the place where, &c.

TRESPASSER, denotes a perſon that commits a treſpaſs againſt another, in reſpect of whom it is held, that though the law permits a perſon to enter a tavern, and a landlord to diſtrain on lands, &c. yet if he abuſes this liberty by committing any treſpaſs, he will be judged a treſpaſſer *ab initio*.

TRESSURE, in heraldry, a diminutive of an orle, uſually held to be half the breadth thereof. See it repreſented in plate CCLXXXVIII. fig. 2.

TRET, in commerce, an allowance made for the waſte, or the dirt, that may be mixed with any commodity, which is always four pounds in every one hundred and four pounds weight. See TARE.

TREVES, or TRIERS. See TRIERS.

TREVI, a town of Italy, in the pope's territory and province of Umbria, ſituated twenty-three miles ſouth-eaſt of Perugia.

TREVIGIO, or TREVISO, a city of Italy, in the territory of Venice, capital of the province of Trevigiano, ſituated fifteen miles north-weſt of Venice.

TREVOUX, a town of France, in the province of Burgundy, and territory of Bourghen-Breſſe, ſituated on the river Saone, twenty-three miles ſouth-weſt of Bourgh.

TREWIA, in botany, a genus of the polyandria-monogynia claſs of plants, having no corolla beſides the cup: the fruit is a turbinated, triquetrous, coronated, trilocular, trivalvar capſule: the ſeed is ſingle, convex on one ſide, and angular on the other. See plate CCLXXXV. fig. 2.

TREZZO, a town of Italy, in the dutchy of Milan, ſituated on the river Adda, fifteen miles north-eaſt of Milan.

TRIA PRIMA, among chemiſts, the three hypoſtatical principles, *viz.* ſalt, ſulphur, and mercury; of which they hold all bodies to be primarily made, and into which they are all held reſolveable by fire.

TRIAL, in law, the examination of a cauſe, civil or criminal, according to the laws of the land, before a proper judge: or, it is the manner and order obſerved in the hearing and determining of cauſes. There are divers kinds of trials; as thoſe of matters of fact, which muſt be tried

tried by a jury; matters of law, which are only triable by the courts; and matters of record, which are to be tried by the records themſelves. The moſt general rule has been, that the jurymen on a trial ſhall be choſen out of that town or precinct, *&c.* in which the matter of fact is alledged, or the neareſt thereto, for the better cognizance of the matter, and not to leave things to be tried in foreign countries, where the jury are ſtrangers to the whole matter. Where any trial is for murder, it muſt be in the county wherein the fact was committed; but if the aſſault be in one county, and the perſon aſſaulted happens to die in another county, the indictment may be found by a jury of the county where the party died: and by ſpecial commiſſion, when a perſon is indicted in one county he may be tried in another. In all criminal caſes the cuſtom is to aſk the priſoner how he will be tried, which was formerly a very ſignificant queſtion, though it is not ſo now, becauſe antiently there were trials by combat, by ordeal, and by jury; and when the priſoner anſwered, by God and his country, it appeared he made choice to be tried by a jury; which is the only way now uſed for the trial of criminals. See COMBAT, MURDER, *&c.*

The method of proceeding in criminal caſes is this: firſt the bill of indictment againſt the offender is prepared, and the proſecutor and his witneſſes attend on the grand-jury therewith, and there give in their evidence; which being done, the grand inqueſt either find the bill of indictment, or bring it in ignoramus; and if the bill be found, the priſoner is brought to the bar of the court, and the clerk of the arraignment calling him by his name, deſires him to hold up his hand, ſaying, "Thou art indicted by the name of — —, for ſuch a felony, *&c.* (ſetting forth the crime laid in the indictment) How ſayeſt thou, art thou guilty of this felony whereof thou art indicted, or not guilty?" To which the priſoner anſwering, "Not guilty," the clerk ſays, "Culprit, how wilt thou be tried?" whereupon the defendant anſwers, "By God and my country;" which plea of the priſoner the clerk records, and then the pannel of the petty-jury is called over. See IGNORAMUS, CULPRIT, JURY, *&c.*

After the jury are ſworn, and the indictment is read over to them, and they are charged, the evidences on both ſides, for and againſt the priſoner, are called, ſworn, and examined in open court; after which the jury bring in their verdict; and if they find the priſoner guilty, their verdict is recorded, and the priſoner is taken from the bar: but if they bring him in not guilty, the priſoner is bid to fall down on his knees, *&c.* On the priſoners being brought in guilty, proclamation is made for all perſons to keep ſilence, upon which the priſoner is again brought to the bar, and the verdict repeated: after which ſentence is paſſed on him, and an order, or warrant, is made for his execution. See the articles FELONY, WARRANT, *&c.*

The methods of trial, in our civil courts, are as follows: *viz.* The declaration is firſt drawn for the plaintiff, and when the appearance of the defendant is entered, it has been uſual to deliver it with an imparlance to the defendant's attorney; and the term following rule is to be given with the ſecondary for the defendant to plead by ſuch a day, or elſe the plaintiff is to have judgment: and the defendant having pleaded, a copy of the iſſue is made by the plaintiff, and delivered to the defendant's attorney, at the ſame time giving him notice of the trial; in order to which the *venire facias* muſt be taken out and returned by the ſheriff; and likewiſe the *habeas corpora,* or *diſtringas,* to bring in the jury; on which the record is made up, and the parties proceed to trial by their council and witneſſes, and the jury give in their verdict, *&c.* But in caſe the defendant neglects to plead, and ſuffers it to go by default, on entering ſuch a judgment, a writ of inquiry of damages is awarded returnable next term; notice of the execution whereof the defendant's attorney is to have, and which being executed, and the damages inſerted in a ſchedule annexed to the writ, a rule is given thereon, and coſts are taxed by the prothonotary, *&c.* See the articles DECLARATION, IMPARLANCE, *&c.*

TRIANDRIA, in the linnæan ſyſtem of botany, a claſs of plants, the third in order; comprehending all ſuch plants as have hermaphrodite flowers, with three ſtamina, or male parts, in each; whence the name.

To this claſs belong the tamarind, valerian, ſaffron, gladiol, iris, *&c.* See the article TAMARIND, &c.

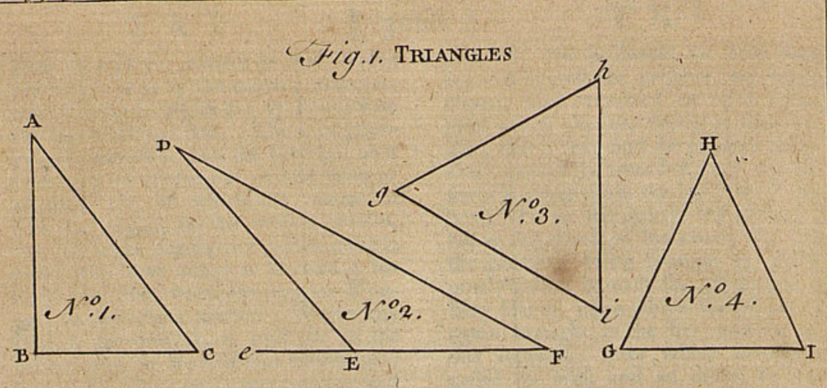



Fig. 2. Rectangular TRIGONOMETRY

No. 1. No. 2. No. 3. No. 4. No. 5. No. 6. No. 7. No. 8.

J. Jefferys sculp

TRIANGLE, in geometry, a figure of three ſides and three angles.

Triangles are either plane or ſpherical. A plane triangle is contained under three right lines; and a ſpherical one is a triangle contained under three arches of great circles of the ſphere. See the article SPHERE.

Triangles are denominated, from their angles, right, obtuſe, and acute. A right-angled triangle is that which has one right angle, as ABC, pl. CCLXXXIII. fig. 1. n° 1. An obtuſe-angled triangle is ſuch as has one obtuſe angle; as DEF; *ibid.* n° 2. And an acute-angled triangle is that which has all its angles acute; as *g h i*, GHI, *ibid.* n° 3. and 4. See the article ANGLE.

And here it may not be improper to explain other diſtinctions of triangles. Any triangle that is not right-angled, is called oblique-angled, or amblygonial. An equilateral-triangle is that which has all its ſides equal; as *g h i*, *ibid.* n° 3. An iſoſceles-triangle is one that has only two ſides equal; as GHI, *ibid.* n° 4. And a ſcalenous-triangle is one that has no two ſides equal; as DEF, *ibid.* n° 2.

In every triangle the ſines of the ſides are proportional to the ſines of the oppoſite angles; alſo the ſine of all the three angles is equal to two right ones; and the external angle, made by any ſide produced, is equal to the ſum of the two internal and oppoſite angles: thus $\angle eED$, (*ibid.* n° 2.) $= \angle EFD + FDE$. Triangles on the ſame baſe, and having the ſame height or place, between the ſame parallels, are equal: alſo triangles on equal baſes, and between the ſame parallels, are equal. If a perpendicular be let fall upon the baſe of an oblique-angled triangle, the difference of the ſquares of the ſides is equal to the double-rectangle under the baſe, and the diſtance of the perpendicular from the middle of the baſe. The ſide of an equilateral-triangle, inſcribed in a circle, is in power triple of the radius. The ſides of a triangle are cut proportionably, by a line drawn parallel to its baſe. A whole triangle is to a triangle cut off by a right line drawn parallel to the baſe, as the rectangle under the cut ſides is to the rectangle of the two other ſides. In a right-angled triangle, a line drawn from the right-angle at the top, perpendicular to the hypothenuſe, divides the triangle into two other right-angled triangles, which are ſimilar to the firſt triangle, and to one another. In every right-angled triangle, the ſquare of the hypothenuſe is equal to the ſum of the ſquares of the other two ſides; that is, $AC^2$ (*ibid.* n° 1.) $= AB^2 + BC^2$. If any angle of a triangle be diſſected, the biſſecting-line will divide the oppoſite ſide in the ſame proportion as the legs of the angle are to one another. Every triangle is one half of a parallelogram of the ſame baſe and height.

The area of any triangle may be had by adding all the three ſides together, and taking half the ſum, and from that half ſum ſubtracting each ſide ſeverally, and multiplying that half ſum and the remainder continually into one another, and extracting the ſquare root of the product.

For the ſolving the ſeveral caſes of plane and ſpherical triangles, ſee the article TRIGONOMETRY.

TRIANGULAR *Compaſſes*, are ſuch as have three legs, or feet, whereby to take off any triangle at once; much uſed in the conſtruction of maps, globes, *&c.*

TRIANGULAR *Numbers*, are a kind of polygonal numbers, being the ſums of arithmetical progreſſions, the difference of whoſe terms is 1.

Thus of arithmetical progre[illegible]56, are formed triangular number[illegible]521.

TRIANGULAR *Canon*, the ta[illegible]artificial ſines, tangents, ſecants, *&c.*

TRIANGULAR *Quadrant*, is a ſector furniſhed with a looſe piece, whereby to make it an equilateral triangle.

The calendar is graduated thereon, with the ſun's place, declination, and other uſeful lines; and by the help of a ſtring and a plummet, and the diviſions graduated on the looſe piece, it may be made to ſerve for a quadrant.

TRIANGULARIS, in anatomy, a name given to two muſcles of the lips, which ariſe each from the lateral and under part of the lower jaw; from whence they aſcend obliquely to the angle of the orbicularis.

There is alſo a muſcle of the breaſt called triangularis ſterni, which riſes from the lower and interior part of the ſternum, and is inſerted on each ſide into the cartilages of the fourth, fifth, ſixth, and ſeventh true ribs: it is one of the conſtrictor or depreſſor muſcles of the breaſt.

One

One of the dilatator mufcles of the urethra is alfo called triangularis from its figure: it rifes from the anterior part of the fphincter of the anus, and is inferted into the pofterior and lower parts of the accelerators, or elfe into the bulb of the urethra.

TRIARII, in the roman militia, a kind of infantry armed with a pike, a fhield, a helmet, and a cuirafs; thus called becaufe they made the third line of battle.

TRIAS HARMONICA, or *the harmonical* TRIAD, in mufic, a compound of three radical founds, heard all together, two whereof are a fifth and third above the other, which is a fundamental.

TRIBE, *tribus*, in antiquity, a certain quantity or number of perfons, when a divifion is made of a city or people into quarters or diftricts.

The tribes of antient Rome bore a great refemblance to our wards. See the article WARD.

TRIBRACHYS, in antient poetry, a foot confifting of three fyllables, and thofe all fhort; as *melius*.

TRIBULUS, CALTROP, in botany, a genus of the decandria-monogynia clafs of plants, the corolla of which confifts of five oblong, obtufe, and patent petals: its fruit is of a roundifh figure and aculeated, being compofed of five capfules, gibbous on one fide, and armed with three or four points on the other, angulated and convergent; and containing numerous feeds, turbinated and oblong.

TRIBUNAL, in general, denotes the feat of a judge, called in our courts bench. See the article BENCH.

The word is latin, and takes its origin from the feat where the tribune of the roman people was placed to adminifter juftice.

The name tribunal was alfo given to the place from whence the people of antient Rome were harangued.

TRIBUNE, *tribunus plebis*, among the antient Romans, a magiftrate chofen out of the commons, to protect them againft the oppreffions of the great, and to defend the liberty of the people againft the attempts of the fenate and confuls.

The tribunes of the people were firft eftablifhed in the year of Rome 259. The firft defign of the creation was to fhelter the people from the cruelty of ufurers, and to engage them to quit the Aventine mount, whither they had retired in difpleafure.

Their number, at firft, was but two; but the next year, under the confulate of A. Pofthumus Aruncius and Caffius Vifcellinus, there were three more added; and this number of five was afterwards increafed, by L. Trebonius, to ten. The appellation, tribune, was given them, by reafon they were at firft chofen out of the tribunes of the army.

*Military* TRIBUNE, *tribunus militum*, or *militaris*, an officer in the Roman army, who commanded in chief over a body of forces, particularly the divifion of a legion, much the fame with our colonel, or the french meftre de camp.

TRIBUNE was alfo an appellation given to various other officers; as the tribuni ærarii, tribunes of the treafury. Tribune of the celeres, the officer who commanded them. Tribuni fabricarum, thofe who had the direction of the making of arms. Tribuni marinorum, tribuni nolanorum, tribuni voluptatum, mentioned in the Theodofian Code, as intendants of the public fhews, and other diverfions. The title of tribune, tribunus, was alfo given to the chief of each tribe.

TRIBUTARY, *tributarius*, one who pays tribute to another, in order to live in peace with him, or fhare in his protection.

TRIBUTE, *tributum*, a tax or impoft which one prince or ftate is obliged to pay to another as a token of dependence, or in virtue of a treaty, and as a purchafe of peace.

The Romans made all the nations they fubdued pay them tribute. Mahomet laid it down as a fundamental of all his law, that all the world fhould pay him tribute. In the ftates of the grand feignior chriftian children are taken by way of tribute. See the article AGEMOGLANS.

Tribute is fometimes alfo ufed for a perfonal contribution, which princes lay upon their fubjects, by way of poll-money.

TRICEPS, in anatomy, the abductor-mufcle of the thigh, having three heads, and as many infertions: the firft and fecond heads of this mufcle arife from the os pubis, near the fynchondrofis; the third, from the tubercle of the ifchium; and it is inferted into the whole fpine of the os femoris.

TRICHECUS, or THRICHECHUS. See the article THRICHECHUS.

TRICHERIÆ, a genus of foffils, naturally and effentially fimple, not inflammable

ſhable nor ſoluble in water; being fibroſe bodies, not elaſtic, and compoſed of ſtraight and continuous filaments. See the article FIBRARIÆ.

To this genus belongs the gypſum ſtriatum of authors, with ſeveral other ſpecies. See the article GYPSUM.

TRICHESTRUM, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ, but differing extremely in figure and ſtructure from the common kinds. See the article SELENITÆ.

The ſelenitæ of this genus are compoſed of filaments ſcarce any where viſibly arranged into plates or ſcales, but diſpoſed in form of a radiated ſtar, made of a number of disjunct ſtriæ.

TRICHIASIS, in ſurgery, an inverſion of the eye-lids, whereby the eye laſhes hurt the eyes.

According to Heiſter, this diſorder is very difficultly remedied; ſince it is hardly poſſible to remove it, ſo as to prevent its returning, without extirpating the offending hairs; and if theſe be cut off cloſe, it will be to no purpoſe, becauſe the rigid ſtumps of the hairs will irritate the eye even worſe than the whole hairs did before. It is a very nice operation alone that can make a cure; here the hairs muſt be pulled up ſingly by the roots, and the places of their inſertion ſingly cauterized with a hot broad pointed needle; but this the patient will ſeldom ſubmit to, and the only remaining method then, is to fill up the ſinus's out of which they were extracted with the lapis infernalis. But in this the greateſt care muſt be taken, that no part of that application get into the eye. The eaſieſt method is the touching the cavities, out of which the hairs have been pulled up, with a pencil-bruſh dipped in a mixture of ſpirit of ſal-armoniac and highly rectified ſpirit of wine, by which means they will cloſe up, and no more hairs will grow from them.

TRICHOSANTHES, in botany, a genus of the monoecia-ſyngeneſia claſs of plants, the corolla of which is monopetalous, divided into five ſegments, and is ciliated: the ſtamina are three very ſhort filaments: the fruit is an oblong apple. This genus comprehends the anguina of Micheli.

TRICHOSTEMA, in botany, a genus of the didynamia-gymnoſpermia claſs of plants, with a monopetalous ringent and falcated flower: the ſtamina are four extremely long filaments; and four roundiſh ſeeds are contained in the cup.

TRICUSPIDES VALVÆ, in anatomy, a name given to the mitral valves, placed at the juncture of the right auricle and ventricle of the heart. See HEART.

TRIDAX, in botany, a genus of the ſyngeneſia-polygamia ſuperflua claſs of plants, with a radiated flower, and the leſſer hermaphrodite ones of the diſc monopetalous, and funnel-faſhioned: the ſeeds are winged with down, and contained in the cup.

TRIDENT, *tridens*, an attribute of Neptune, being a kind of ſceptre which the painters and poets put into the hands of that god, in form of a ſpear, or fork, with three teeth; whence the word.

TRIDENT, among mathematicians, is uſed for a kind of parabola, by which Des Cartes conſtructed equations of ſix dimenſions.

TRIEDROSTYLA, in natural hiſtory, the name of a genus of ſpars, in form of trigonal columns, adhering by one end to ſome ſolid body, and terminated at the other by a trigonal pyramid. See SPAR.

Of this genus there are four known ſpecies. 1. A ſlender one, with a long, obtuſe pyramid: this is one of the moſt common of all the ſpars, and is found in almoſt all parts of the world, ſometimes in ſingle and large ſpecimens, but more frequently in large congeries, coating over the fiſſures of ſtone, in form of cruſts. 2. One with ſhort, but pointed pyramids, common on Mendip-hills, and found in ſome other parts of England. 3. A thick one, with a longer pyramid, found in Northamptonſhire, and ſome other parts of the kingdom, encruſting the fiſſures of ſtone. And, 4. One with a very ſhort column, and a long, obtuſe pyramid: this is frequent in the mines of Germany, and not leſs ſo in thoſe of England, particularly in Derbyſhire.

TRIEMIMERIS, a kind of cæſura in latin verſe, wherein after the firſt foot of the verſe there remains an odd ſyllable, which helps to make up the next foot.

TRIENNIAL, an epithet applied chiefly to offices or employments which laſt for three years.

TRIENS, in antiquity, a copper money of the value of one third of an as, which on one ſide bore a Janus's head, and on the other a water-rat.

This was the piece of money uſed to be

put in the mouths of the deceafed to pay Charon his fare, for their paffage into another life.

TRIENTALIS, in botany, a genus of the heptandria-monogynia clafs of plants, with a ftellated monopetalous flower: its fruit is a dry, globofe and unilocular berry, containing a few angulated feeds.

TRIERS, or TREVES, the capital of the electorate of Triers, in Germany, fituated on the river Mofelle, fixty miles fouth of Cologn: eaft long. 6° 10', north lat. 49° 55'.

TRIEXAHÆDRIA, in natural hiftory, the name of a genus of perfect and pellucid, cryftalliform fpars, confifting of thrice fix planes, being compofed of an hexangular column, terminated at each end by an hexangular pyramid. Of this genus there are three known fpecies. 1. A clear one, with narrow and oblong pyramids: this is found in the mountains of Germany and in North-Wales; but with us it is fmall and coarfe. 2. One with fhort pyramids, and a long column: this is found in the mines at Goffelaer, in Saxony. And, 3. One with fhort pyramids, and a thick and fhort column, found with us in the lead-mines of Yorkfhire. See the article SPAR.

TRIESTE, a port-town of Iftria, fituated on the gulph of Venice, fixty miles north-eaft of that city.

TRIFOLIUM, TREFOIL, in botany. See the article TREFOIL.

TRIGA, in antiquity, denotes a kind of carr, or chariot, drawn by three horfes; whence the name.

TRIGAMY, a third marriage, or the ftate of a perfon who has been married three times. See MARRIAGE.

TRIGLA, in ichthyology, a genus of fifhes, of the order of the acanthopterigii, the characters of which, according to Artedi, are thefe: the branchioftege membrane contains feveral bones; the head is very declivious, from the eyes to the end of the fnout, and is large, aculeated, and as it were fquare; the head is the broadeft part of the fifh; it thence grows gradually narrower, till it ends in a very fmall tail: in many of the fpecies of this fifh, there are two or three articulated appendices growing under the pectoral fins: the eyes ftand on the top of the head, and are covered with a fkin; there are two back fins, the firft of which is prickly; the pectoral fins in fome of the fpecies are very large.

This genus comprehends the mullet, hirundo pifcis, tub-fifh, gurnard, &c. See the article MULLET, &c.

TRIGLOCHIN, in botany, a genus of graffes, belonging to the hexandria-trigynia clafs of plants, the flower of which confifts of three oval, concave, and obtufe petals; and its fruit is an oblong capfule of an oval figure, with three cells, in each of which is a fingle oblong feed.

TRIGLYPHS, in architecture, a fort of ornaments repeated at equal intervals in the doric freeze. See the articles DORIC and FREEZE.

Each triglyph confifts of two entire gutters, or channels, cut to a right angle, called glyphes, and feparated by three interftices, called, by Vitruvius, femora, from each other, as well as from two other half channels which are at the fides.

The ordinary proportion of triglyphs is to be a module broad, and one and a half high. But this proportion, M. le Clerc obferves, fometimes occafions ill-proportioned intercolumnations in porticos; for which reafon he chufes to accommodate the proportion of his triglyphs to that of the intercolumns.

TRIGON, τρίγωνος, a triangle. See the article TRIANGLE.

In aftrology, trigon denotes the fame with trine. See the article TRINE.

TRIGONELLA, in botany, a genus of the diadelphia-decandria clafs of plants, with a papilionaceous tetrapetalous flower: the fruit is an oblong, oval pod, of a compreffed figure, and containing feveral roundifh feeds.

TRIGONOMETRY, that part of geometry, which teaches how to meafure the fides and angles of triangles. See the article TRIANGLE.

Trigonometry is either plane or fpherical, according as the triangles are plane or fpherical; of each whereof we fhall treat in order.

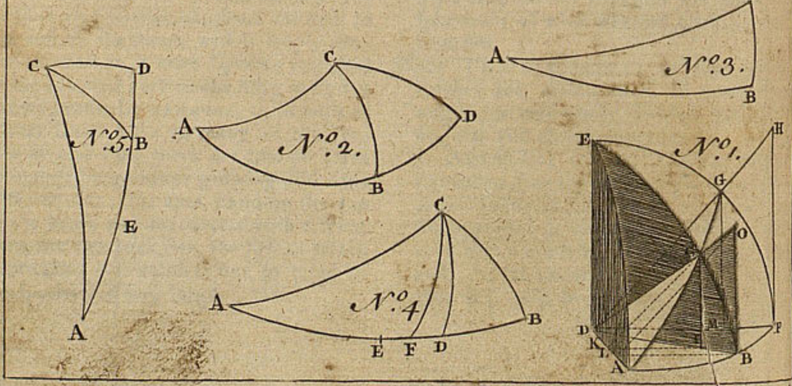
*Plane* TRIGONOMETRY, or that which teaches the menfuration of plane triangles, is commonly divided into rectangular and oblique-angular.

I. And firft of rectangular plane trigonometry; if in any right-angled triangle, ABC (plate CCLXXXIII. fig. 2. n° 1.) the hypothenufe be made the radius, and with that a circle be defcribed on the one end, A, as a center; then, it is plain, that BC will be the fine of the angle BAC;

*Fig. 1.* Oblique-angled TRIGONOMETRY

No. 1. No. 2. No. 3. No. 4. No. 5. No. 6. No. 7. No. 8. No. 9.

*Fig. 2.* Spherical TRIGONOMETRY




*T. Jefferys sculp.*

BAC; and if with the same distance, and on the end B as a center, a circle be described it is plain that AC will be the sine of the angle ABC; therefore, in general, if the hypothenuse of a right angled triangle be made the radius, the two legs will be the sines of their opposite angles. See SINE, RADIUS, *&c.*

Again, if in a right-angled triangle DEF (*ibid.* n° 2.) one of the legs, as DF, be made the radius, and on the extremity D (at one of the oblique angles, *viz.* that which is formed by the hypothenuse and the leg made radius) as a center, a circle be described; it is plain that the other leg, EF, will be the tangent of the angle at D, and the hypothenuse DE will be the secant of the same angle. The same way, making the leg EF the radius, and on the center E describing a circle, the other leg DF will become the tangent of the angle at E, and the hypothenuse DE the secant of the same. See the articles TANGENT and SECANT.

The chord, sine, tangent, *&c.* of any arch, or angle, in one circle, is proportionable to the chord, sine, tangent, *&c.* of the same arch in any other circle: from which, and what has been said above, the solutions of the several cases of rectangular trigonometry naturally follow. See CHORD, ARCH, *&c.*

Since trigonometry consists in determining angles and sides from others given, there arises various cases; which being seven in rectangular-trigonometry, are as follow.

Case I. The angles, and one of the legs, of a right-angled triangle be given, to find the other leg.

Example. In the triangle ABC (*ibid.* n° 3.) right-angled at B, suppose the leg AB = 86 equal parts; as feet, yards, miles, *&c.* and the angle A = 33° 40′; required the other leg BC, in the same parts with AB.

1. Geometrically: Draw AB = 86, from any line of equal parts; upon the point B, erect the perpendicular BC; and, lastly, from the point A, draw the line AC, making with AB an angle of 33° 40′; and that line produced will meet BC in C, and so constitute the triangle. The length of BC may be found by taking it in your compasses, and applying it to the same line of equal parts that AB was taken from.

2. By calculation: First, by making the hypothenuse AC radius, the other two legs will be the sines of their opposite angles, *viz.* AB the sine of C, and CB the sine of A. Now since the sine, tangent, *&c.* of any arch in one circle is proportionable to the sine, tangent, *&c.* of the same arch in any other circle, it is plain the sines of the angles A and C in the circle described by the radius AC, must be proportional to the sine of the same arches or angles, in the circle, that the table of artificial sines, *&c.* was calculated for; so the proportion for finding BC will be

S, C : AB : : S, A : BC

*i. e.* As the sine of the angle C in the tables, is to the length of AB (or sine of C in the circle whose radius is AC) so is the sine of the angle A in the tables, to the length of BC (or sine of the same angle in the circle whose radius is AC.) Now the angle A being 33°, 40′, the angle C must be 56°, 20′; therefore looking in the table of artificial sines, *&c.* for the sines of the two angles, and in the table of logarithms for the logarithm of 86 the given leg, we shall find by proceeding according to the foregoing proportion, that the required leg BC, is 57.28; and the operation will stand as follows:

| | | |
|---|---|---|
| 1.93450 | AB | 86 |
| 9.74380 | S, A | 33°, 40′ |
| 11.67830 | | |
| 9.92027 | S, C | 56°, 20′ |
| 1.75803 | BC | 57.28 |

Secondly, Making AB the radius, it is plain BC, the leg required, will be the tangent of the given angle A, and so the proportion for finding BC, when AB is made the radius, will be:

R : T, A : : AB : BC

*i. e.* as the radius in the tables, is to the tangent of the angle A in the same, so the length of BA, or radius in the scheme, to the length of BC or tangent of A in the scheme; therefore looking in the tables for the parts given in the foregoing proportion, and proceeding with them according to that rule, we shall find BC to be 57.28 as before, and the operation will be as follows:

| | | |
|---|---|---|
| 9.82352 | T, A | 33°, 40′ |
| 1.93450 | AB | 86 |
| 11.75802 | | |
| 10.00000 | Rad. | 90° |
| 175802 | BC | 57.28 |

Laftly, by making B C, the leg required, the radius, it is plain that A B will be the tangent of C, and the proportion for finding B C will be as follows :

T, C : R : : A B : B C

| | | |
|---|---|---|
| *i. e.* as the tangent of C | 56°, 20′ | 10.17648 |
| is to radius - - | 90° | 10.00000 |
| fo is the length of AB | 86 | 1.93450 |
| | | 11.93450 |
| | | 10.17648 |
| to the length of B C | 57.28 | 1.75802 |

Cafe II. The angles and one of the legs given, to find the hypothenufe.

Example : In the triangle A B C, (*ibid.* n° 4.) fuppofe A B 124, and the angle A 34°, 20′ ; confequently the angle C 55°, 40′, required the hypothenufe A C, in the fame parts with A B.

1. Geometrically : this cafe is conftructed after the fame manner with the former; and the hypothenufe, A C, is found, by taking its length in your compaffes, and applying that to the fame line of equal parts from which A B was taken.

2. By calculation : firft, making A C the radius, we fhall have the following proportion for finding A C, *viz.*

S, C : R : : A B : A C.

| | | |
|---|---|---|
| *i. e.* as the fine of C | 55° 40′ | 9.91686 |
| is to radius - - | 90° | 10.00000 |
| fo is A B - | 124 | 2.09342 |
| to A C - - | 150.2 | 2.17656 |

Secondly, making AB the radius, we have this proportion, *viz.*

R : fec. A : : A B : A C.

| | | |
|---|---|---|
| *i. e.* as the radius | 90° | 10.00000 |
| to the fecant of A | 34° 20′ | 10.08314 |
| fo is A B - | 124 | 2.09342 |
| to A C | 150.2 | 2.17656 |

This may alfo be done, without the help of the fecants ; for fince R : fec. : : Co - S. : R ; therefore, the former proportion will become,

Co - S, A : R : : A B : A C.

| | | |
|---|---|---|
| *i. e.* as the co-fine of A | 34°, 20′ | 9.91686 |
| is to the radius | 90° | 10.00000 |
| fo is A B - - | 124 | 2.09342 |
| to A C - - | 150.2 | 2.17656 |

Thirdly, Making B C the radius, we have the following proportion, *viz.*

T, C : fec. C : : A B : A C.

| | | |
|---|---|---|
| *i. e.* as the tangent of C | 55°, 40′ | 10.16558 |
| is to fec. C - | 55°, 40′ | 10.24872 |
| fo is A B - | 124 | 2.09342 |
| to A C - | 150.2 | 2.17656 |

This likewife may be done without the help of fecants ; for fince T, : Sec. : : S, : R; therefore the former analogy will be reduced to this, *viz.*

S, C : R : : A B : A C

where no fecants do appear, and it coincides with that in the firft fuppofition of this cafe, fo we fhall not repeat the operation.

Cafe III. The angles and hypothenufe given, to find either of the legs.

Example : In the triangle A B C, (*ibid.* n° 4.) fuppofe the hypothenufe A C = 146, and the angle A = 36° 25′ ; confequently the angle C = 53° 35′ ; required the leg A B.

1. Geometrically : draw the line A B at pleafure, and make the angle B A C equal to 36°, 25′ ; then take A C equal to 146 from any line equal parts ; laftly, from the point C, let fall the perpendicular C B, on the line A B. So the triangle is conftructed, and A B may be meafured from the line of equal parts.

2. By calculation : firft, making A C the radius, we fhall have the following proportion, *viz.*

R : S, C : : A C : A B.

| | | |
|---|---|---|
| *i. e.* As radius | 90° | 10.00000 |
| to the fine of C | 53° 35′ | 9.90565 |
| fo is A C | 146 | 2.16435 |
| to A B | 117.5 | 2.07000 |

Secondly, making A B the radius, we have the following analogy, *viz.*

Sec. A : R : : A C : A B.

| | | |
|---|---|---|
| *i. e.* As the fecant of A | 36° 25′ | 10.09435 |
| is to radius | 90° | 10.00000 |
| fo is A C | 146 | 2.16435 |
| to A B | 117.5 | 2.07000 |

This may alfo be done without the help of fecants ; for fince fec. : R : : R : Co-S, the former proportion may be reduced to this, *viz.*

R : Co-S, A : : A C : A B,

which is the fame with the proportion in the firft fuppofition.

Thirdly, By fuppofing B C the radius, we have the following proportion, *viz.*

Sec. C : T, C : : A C : A B,

| | | |
|---|---|---|
| *i. e.* as the fecant of C | 53°, 35′ | 10.22647 |
| is to the tangent of C | 53°, 35′ | 10.13212 |
| fo is A C - | 146 | 2.16435 |
| to A B - | 117.5 | 2.07000 |

Cafe IV. The two legs being given, to find the angles.

Example : In the triangle A B C, (*ibid.* n° 5 ) fuppofe A B 94 and B C 56, required the angles A and C.

1. Geometrically : draw A B equal to 94, from any line of equal parts, then from the point B raife B C perpendicular

in

to A B, and take B C, from the former line of equal parts equal to 56; laſtly, join the points A and C with the ſtreight line A C, ſo the triangle is conſtructed, and the angles may be meaſured by a line of chords. See the articles SCALE and SECTOR.

2. By calculation: firſt, ſuppoſing A B the radius, we have this analogy, *viz.*

A B : B C : : R : T, A,

| | | |
|---|---|---|
| *i. e.* as A B | 94 | 1.97313 |
| is to B C | 56 | 1.74819 |
| ſo is the radius | 90° | 10.00000 |
| to the tangent of A | 30°, 47′ | 9.77506 |

Secondly, making B C the radius, we have this proportion, *viz.*

B C : B A : : R : T, C.

| | | |
|---|---|---|
| *i. e.* as B C | 56 | 1.74819 |
| is to A B | 94 | 1.97313 |
| ſo is the radius | 90° | 10.00000 |
| to the tangent of C | 59° 13′ | 10.22494 |

Caſe V. The hypothenuſe and one of the legs given, to find the angles.

Example: In the triangle D E F, (*ibid.* n° 6.) ſuppoſe the leg D E = 83, and the hypothenuſe D F = 126; required the angles D and F.

1. Geometrically: draw the line D E = 83, from any line of equal parts; and, from the point E, raiſe the perpendicular E F: then take the length of D F = 126, from the ſame line of equal parts; and ſetting one foot of your compaſſes in D, with the other croſs the perpendicular E F in E: Laſtly, join D and F; and the triangle being thus conſtructed, the angles may be meaſured by a line of chords.

2. By calculation: firſt, making D F the radius, we ſhall have this proportion, *viz.*

D F : D E : : R : S, F.

| | | |
|---|---|---|
| *i. e.* as D F | 126 | 2.10037 |
| is to D E | 83 | 1.91908 |
| ſo is radius | 90° | 10.00000 |
| to the ſine of F | 41° 12′ | 9.81871 |

Secondly, by ſuppoſing D E the radius, we have the following analogy, *viz.*

D E : D F : : R : Sec. D.

| | | |
|---|---|---|
| *i. e.* as D E | 83 | 1.91908 |
| is to D F | 126 | 2.10037 |
| ſo is radius | 90° | 10.00000 |
| to the ſecant of D | 48° 48′ | 10.18129 |

This may be done without the help of ſecants; for ſince R : ſec. : : Co-S, : R, the foregoing analogy will become this, *viz.*

D F : D E : : R : Co-S, D.

which gives the ſame anſwer, with that deduced from the firſt ſuppoſition.

Caſe VI. The two legs being given, to find the hypothenuſe.

Example: In the triangle A B D, (*ibid.* n° 7.) ſuppoſe the leg A B = 64, and B D = 56: required the hypothenuſe.

1. Geometrically: the conſtruction of this caſe is performed the ſame way as in the fourth caſe, and the length of the hypothenuſe is found by taking it in your compaſſes, and applying it to the ſame line of equal parts, that the two legs were taken from.

2. By calculation: this caſe being a compound of the fourth and ſecond caſes, we muſt firſt find the angles by the fourth, thus:

A B : D B : : R : T, A.

| | | |
|---|---|---|
| *i. e.* as the leg A B | 64 | 1.80618 |
| is to the leg D B | 56 | 1.74819 |
| ſo is the radius | 90 | 10.00000 |
| to the tangent of A | 41° 11′ | 9.94201 |

Then by the ſecond caſe we find the hypothenuſe required thus:

S, A : R : : B D : A D,

| | | |
|---|---|---|
| *i. e.* as the ſine of A | 41°, 11′ | 9.81854 |
| is to the radius | 90° | 10.00000 |
| ſo is the leg B D | 56 | 1.74819 |
| to the hypoth. A D | 85.05 | 1.92965 |

This caſe may alſo be ſolved after the following manner, *viz.*

| | |
|---|---|
| From twice the log. of the greater ſide A B - - | 3.61236 |
| ſubtract the log. of the leſſer ſide B D | 1.74819 |
| and there remains - | 1.86417 |

the logarithm of 73.15; to which adding the leſſer ſide B D, we ſhall have

| | |
|---|---|
| 189.15 whoſe log. is - | 2.11093 |
| to which add the log. of the leſſer ſide B D - - | 1.74819 |
| and the ſum will be | 3.85912 |
| the half of which is | 1.92956 |

the logarithm of the hypothenuſe required. See the article LOGARITHM.

Or it may be done by adding the ſquare of the two ſides together, and taking the logarithm of that ſum, the half of which is the logarithm of the hypothenuſe required: thus, in the preſent caſe,

the ſquare of A B (64) is 4096
the ſquare of B D (56) is 3136
the ſum of theſe ſquares is 7232
the log. of which is 3.85926
the half of which is 1.92963 =
to the logarithm of 85.05, the length of the hypothenuſe required.

Caſe VII. The hypothenuſe and one of the legs being given, to find the other leg.

Example: in the triangle B G D, (*ibid.* n° 8.) ſuppoſe the leg B G = 87, and the hypothenuſe B D = 142; required the leg D G,

1. Geo-

1. Geometrically: the conſtruction here is the ſame as in caſe V. the ſame things being given; and the leg D G is found by taking its length in your compaſſes, and applying that to the ſame line of equal parts, the others were taken from.

2. By calculation: the ſolution of this caſe depends upon the 1ſt and 5th, and firſt we muſt find the oblique angles by caſe 5th thus:

D B : B G : : R : S, D.

| | | | |
|---|---|---|---|
| *i. e.* as the hypoth. D B | 142 | | 2.15229 |
| is to the leg B G | 87 | | 1.93952 |
| ſo is radius - | 90°, | | 10.00000 |
| to the ſine of D - | 37°, 47′ | | 9,78723 |

Then by caſe 1ſt, we find the leg D G required, thus:

R : S, B : : B D : D G,

| | | |
|---|---|---|
| *i. e.* as radius | 90° | 10 00000 |
| is to the ſine of B | 52°, 13′ | 9.89781 |
| ſo is the hypoth. D B | 142 | 2.15229 |
| to the leg D G | 112.2 | 2,05010 |

The leg D G may alſo be found in the following manner, *viz.*

| | |
|---|---|
| To the log. of the ſum of the hypothenuſe and given leg, *viz.* 229 - - | 2.35984 |
| add the log. of their difference, *viz.* 55 | 1.74036 |
| and their ſum is - - | 4.10020 |
| the half of that is - - | 2.05010 |

the log. of 112.2 the leg required.

Or it may be done by taking the ſquare of the given leg from the ſquare of the hypothenuſe, and the ſquare root of the remainder is the leg required: thus, in the preſent caſe.

| | |
|---|---|
| The ſquare of the hypothenuſe (142) is - - | 20164 |
| The ſquare of the leg B G (87) is | 7569 |
| Their difference is - - | 12595 |
| Whoſe logarithm is - - | 4.10020 |
| The half of which is - | 2.05010 |

which anſwers to the natural number 112.2 the leg required.

Thus have we gone through the ſeven caſes of right-angled plane-trigonometry; from which we may obſerve; 1. That to find a ſide, when the angles are given, any ſide may be made the radius. 2. To find an angle, one of the given ſides muſt of neceſſity be made the radius.

II. We now proceed to oblique angled plane-trigonometry, in which there are ſix caſes; but before we ſhew their ſolution, it will be proper to premiſe the following theorems.

Theorem 1. In any triangle ABC (plate CCLXXXIV. fig. 1. n° 1.) the ſides are proportional to the ſines of the oppoſite angles: thus, in the triangle A B C, A B : B C : : S, C : S, A, and A B : A C : : S, C : S, B : alſo A C : B C : : S, B : S, A.

Demonſtration: let the triangle A B C be inſcribed in a circle; then, it is plain (from the property of the circle) that the half of each ſide is the ſine of its oppoſite angle: but the ſines of theſe angles, in tabular parts, are proportional to the ſines of the ſame in any other meaſure; therefore, in the triangle A B C, the ſines of the angles will be as the halves of their oppoſite ſides; and ſince the halves are as the wholes, it follows, that the ſines of the angles are as their oppoſite ſides; *i. e.* S, C : S, A : : A B : B C, &c.

Theor. 2. In any plane triangle, as A B C (*ibid.* n° 2.) the ſum of the ſides, A B and B C, is to the difference of theſe ſides, as the tangent of half the ſum of the angles B A C, A B C, at the baſe, is to the tangent of half the difference of theſe angles.

Demon. Produce A B; and make B H equal to B C; join H C, and from B let fall the perpendicular B E; through B draw B D parallel to A C, and make H F equal to C D, and join B F; alſo take B I equal to B A, and draw I G parallel to B D or A C.

Then it is plain that A H will be the ſum, and H I the difference of the ſides A B and B C; and ſince H B is equal to B C, and B E perpendicular to H C, therefore H E is equal to E C; and B D being parallel to A C and I G, and A B equal to B I, therefore C D or H F is equal to G D, and conſequently H G is equal to F D, and half H G is equal to half F D or E D. Again, ſince H B is equal to B C, and B E perpendicular to H C, therefore the angle E B C is half the angle H B C; but the angle H B C is equal to the ſum of the angles A and C, conſequently the angle E B C is equal to half the ſum of the angles A and C. Alſo ſince H B is equal B C, and H F equal to C D, and the included angles B H F, B C D equal, it follows that the angle H B F is equal to the angle DBC, which is equal to BCA; and ſince HBD is equal to the angle A, and HBF equal to B C A, therefore F B D is the difference, and E B D half the difference of the two angles A and B C A; ſo making

making E B the radius, it is plain E C is the tangent of half the ſum, and E D the tangent of half the difference of the two angles at the baſe. Now I G being parallel to A C, the triangles H I G and H A C will be equiangular; conſequently A H : I H : : C H : G H; but the wholes are as their halves, therefore A H : I H : : $\frac{1}{2}$ C H : $\frac{1}{2}$ G H; and ſince $\frac{1}{2}$ C H is equal to E C, and $\frac{1}{2}$ G H equal to $\frac{1}{2}$ F D = E D, therefore A H : I H : : E C : E D. Now A H is the ſum, and I H the difference of the ſides; alſo E C is the tangent of half the ſum, and E D the tangent of half the difference of the two angles at the baſe; conſequently, in any triangle, as the ſum of the ſides is to their difference, ſo is the tangent of half the ſum of the angles at the baſe to the tangent of half their difference.

Theorem 3. If to half the ſum of two quantities be added half their difference, the ſum will be the greater of them; and if from half their ſum be ſubtracted half their difference, the remainder will be the leaſt of them. Suppoſe the greater quantity to be $x = 8$, and the leſſer $z = 6$; then is their ſum 14, and difference 2: wherefore, adding $\frac{14}{2} = 7$ to $\frac{2}{2} = 1$, we get 8 the greateſt of the two quantities: and, in the ſame manner, $\frac{14}{2} - \frac{2}{2} = 7 - 1 = 6$, the leaſt of the two quantities.

Theor. 4. In any right-lined triangle, ABD (*ibid.* n° 3.) the baſe A D is to the ſum of the ſides A B and B D; as the difference of the ſides is to the difference of the ſegments of the baſe made by the perpendicular B E, *viz.* the difference between A E and E D.

Demon. Produce D B till B G be equal to BA the leſſer leg; and on B as a center with the diſtance B A or B G, deſcribe the circle A G H F, which will cut B D and A D in the points H and F; then it is plain G D is the ſum, and H D the difference of the ſides; alſo ſince A E is equal to E F; therefore F D is the difference of the ſegments of the baſe; but A D : G D : : H D : F D; therefore the baſe is to the ſum of the ſides, &c. as was to be proved.

Having eſtabliſhed theſe preliminary theorems, we ſhall now proceed to the ſolution of the ſix caſes of oblique-angled plane trigonometry.

Caſe I. In any oblique-angled plane triangle, two ſides and an angle oppoſite to one of them being given, to find the angle oppoſite to the other.

Example: In the triangle A B C (*ibid.* n° 4.) ſuppoſe A B = 156, BC = 84, and the angle C (oppoſite to AB) = 56° 30′; required the angle A, oppoſite to B C.

1. Geometrically: Draw the line A C, and at any point of it, ſuppoſe C, make the angle C = 56° 30′; then take CB = 84, and with the length of 156 = A B taken in your compaſſes from the ſame ſcale of equal parts, fixing one point in B, with the other croſs A C in A. Laſtly, join A and B; ſo the triangle is conſtructed, and the required angle A may be meaſured by a line of chords.

2. By calculation: We have, by theor. 1. the following proportion for finding the angle A, *viz.*

A B : B C : : S, C : S, A.

| | | |
|---|---|---|
| *i. e.* as AB - - | 156 - - | 2.19312 |
| To B C - - - | 84 - - | 1.92428 |
| So is S, C - - | 56° 30′ - | 9.92111 |
| To S, A - - | 26° 41′ - | 9.65227 |

Caſe II. The angles, and a ſide oppoſite to one of them, being given, to find a ſide oppoſite to another.

Example: In the triangle H B G (*ibid.* n° 5.) ſuppoſe the angle H 46° 15′, and the angle B 54° 22′, conſequently the angle G 79° 23′, and the leg H B 125, required H G.

Geometrically: Draw H B 125, from any line of equal parts, and make the angle H 46° 15′, and B 54° 22′, then produce the lines H G and B G till they meet one another in the point G; ſo the triangle is conſtructed, and H G is meaſured by taking its length in your compaſſes, and applying it to the ſame line of equal parts that H B was taken from.

2. By calculation: By the firſt of the preceding theorems, we have this analogy for finding H G, *viz.*

S, G : H B : : S, B : H G.

| | | |
|---|---|---|
| *i. e.* As the ſine of G | 79° 23′ | 9.99250 |
| is to the leg H B - | 125 - | 2.09691 |
| ſo is the ſine of B - | 54° 22′ - | 9.90996 |
| to the leg H G - | 103.4 - | 2.01437 |

Caſe III. Two ſides and an angle oppoſite to one of them given, to find the third ſide.

Example: In the triangle K L M (*ibid.* n° 6.) ſuppoſe the ſide C L 126 equal parts, and K M 130 of theſe parts, and the angle L (oppoſite to K M) 63° 20′, required the ſide M L.

1. Geometrically: The conſtruction of this

this case is the same with that in Case I. (there being the same things given in both) and the leg M L may be measured by applying it to the same line of equal parts that the other two were taken from.

2. By calculation: The solution of this case depends upon the two preceding ones; and, first, we must find the other two angles by Case I. thus:

M K : S, L : : K L : S, M.

*i. e.* As the side M K  130  2.11394
To the sine of L  63° 20′  9.95116
So is the side K L  126  2.10037
To the sine of M  60° 1′  9.93759

Then by Case II. we have the required leg M L, thus:

S. L : S. K : : M K : M L.

*i. e.* As the sine of L  63° 20′  9.95116
To the sine of K - 53° 39′  9.90602
So is M K - - - 130  2.11394
To M L - - - - 117.2  2.06850

Case IV. Two sides and the contained angle being given, to find the other two angles.

Example: In the triangle A C D (*ibid.* n° 7.) suppose A C = 103, AD = 126, and the angle A = 54° 30′; required the angles C and D.

1. Geometrically: Draw A D = 126, and make the angle A = 54° 30′; then set off 103 equal parts from A to C: lastly, join C and D; and so the triangle is constructed, and the angles C and D may be measured by a line of chords.

2. By calculation: The solution of this case depends upon the second and third of the preceding theorems; and first we must find the sum and difference of the sides, and half the sum of the unknown angles, thus:

The leg A D is - - - - - 126
The leg A C is - - - - - - 103
Their sum is - - - - - - 229
And their difference is - - - - 23
The sum of the three angles A, D and C is - - - } 180°
The angle A is - - - - 54°. 30
So the sum of the angles C and D will be - - - } 125°, 30′
And half their sum is - - 62° 45′

Then by theor. 2. we have the following proportion, *viz.*

As the sum of the sides A D and A C = 229 - - } 2.35984
To their difference - 23 - 1.36173
So is the tangent of half the sum of the unknown angles C and D } 62° 45′ 10.28816
To tang. of half their difference - - } 11° 2′ 9.29065

Now having half the sum and half the difference of the two unknown angles C and D, we find the quantity of each of them by theorem 3. thus:

To half the sum of the angles C and D, *viz.* - - } 62° 45′
Add half their difference, *viz.* 11° 02′
And the sum is the greater ang. C 73° 47′
Again, from half their sum, *viz.* 62° 45′
Take half their difference, *viz.* 11° 02′
And there will remain the lesser angle D - - - } = 51° 43′

N. B. The greater angle is always that subtended by the greater side: thus, in the present case, the greater angle C, is subtended by the greater side A D; and the lesser angle D, is subtended by the lesser side A C.

Case V. Two sides and the contained angle being given, to find the third side.

Example. In the triangle B C D (*ibid.* n° 8.) suppose B C = 154, B D = 133, and the angle B = 56° 03′; required the side C D.

1. Geometrically: The construction of this case is the same with that of the last, and the length of D C is found by taking its length in your compasses, and applying it to the same line of equal parts that the two legs were taken from.

2. By calculation: The solution of this case depends upon the second and fourth; and first we must find the angles by the last case; thus:

As the sum of the sides B D and B C 287 - - - } 2.45788
Is to their difference 21 - 1.32222
So is the tangent of half the sum of the angles D and C } 61° 58′ 10.27372
To the tangent of half their difference 7, 50′ - - } 9.13806

So by theorem 3. we have the angles D and C thus:

To half the sum of the angles D and C - - - } 61° 58′
Add half their difference - 7° 50′
And the sum is the greater angle D 69° 48′
Also, from half the sum - 61° 58′
Take half the difference - 7° 50′
And there remains the lesser angle C - - - } 54° 08′

Then by Case II. we have the following analogy for finding D C the leg required, *viz.*

S, C:

S, C : B D : : S, B : D C.

| | | | |
|---|---|---|---|
| *i. e.* As the fine of C | 54° 08′ | 9.90869 | |
| To B D | - - | 133 | 2.12385 |
| So is the fine of B | 56° 03′ | 9.91883 | |
| To D C | - - | 136.2 | 2.13399 |

Cafe VI. Three fides being given, to find the angles.

Example: In the triangle A B C (*ibid.* n° 9.) fuppofe A B = 156, A C = 185.7, and B C = 84; required the angles A, B, and C.

1. Geometrically: Make A C = 185.7 from any line of equal parts; and from the fame line taking 156 = A B in your compaffes, fix one foot of them in A, and with another fweep an arch; then take 84 = B C in your compaffes, and fixing one foot in C, with the other fweep an arch, which will crofs the former in B: laftly, join the points B and A, and B and C; fo the triangle will be conftructed, and the angles may be meafured by a line of chords.

2. By calculation: Let fall the perpendicular, B D, from the vertex B, upon the bafe A C; which will divide the bafe into two fegments A D and D C, the lengths whereof may be found by theor. 4. thus:

| | | |
|---|---|---|
| As the bafe A C | - 185.7 - | 2.26893 |
| To the fum of the fides A B and B C 240 | - - | 2.38031 |
| So is the diff. of the fides | 72 | 1.85733 |
| To the difference of the fegments of the bafe 93 | | 1.96871 |

And having the fum of the fegments, *viz.* the whole bafe, and their difference, we find the fegments themfelves, by theorem 3. thus:

| | |
|---|---|
| To half the fum of the fegments - | 92.8 |
| And half their difference - - | 46 5 |
| And the fum is the greater feg. AD | 139.3 |
| Alfo from half the fum of the feg. | 92.8 |
| Take half, their difference | 46.5 |
| The remainder is the leffer feg. D C | 46.3 |

Now the triangle A B C is divided, by the perpendicular D B, into two right-angled triangles, A D B, and D B C; in the firft of which are given the hypothenufe A B = 156, and the bafe A D = 139.3, to find the oblique angles, for which we have (by Cafe V. of rectangular trigonometry) the following analogy, *viz.*

| | | |
|---|---|---|
| As A B - - | 156 | 2.19312 |
| To A D - - | 139.3 | 2.14395 |
| So is the radius - | 90° | 10.00000 |
| To the co-fine of the angle A - - | 26° 40′ | 9.95083 |



Alfo the angle C is found by the fame cafe, thus:

| | | |
|---|---|---|
| As B C - - | 84 - | 1.92428 |
| To C D - - | 46.3 - | 1.66558 |
| So is the radius | 90° - | 10 00000 |
| To the co-fine of C | 56° 30′ | 9 74130 |

Having found the two angles A and C, we have the third, B, by taking the fum of the other two from 180, thus:

| | |
|---|---|
| The fum of all the three angles is | 180° |
| The fum of A and C is - | 83° 10′ |
| The angle B is - - | 96° 50′ |

All the proportions ufed for the folutions of the feveral cafes in plain trigonometry, may be performed by the fcale and compafs. On the fcale there are feveral logarithmic lines, *viz.* one of numbers, another of fines, and one of tangents, &c. See the article Scale.

And the way of working a proportion by thefe is this, *viz.* extend your compaffes from the firft term of your proportion, found on the fcale, to the fecond, and with that extent, fixing one foot in the third term, the other will reach the fourth term required.

*Spherical* Trigonometry, is the art whereby, from three given parts of a fpherical triangle, we difcover the reft; and, like plane trigonometry, is either right-angled, or oblique-angled. But before we give the analogies for the folution of the feveral cafes in either, it will be proper to premife the following theorems.

Theorem 1. In all right-angled fpherical triangles, the fine of the hypothenufe: radius : : fine of a leg : fine of its oppofite angle. And the fine of a leg : radius : : tangent of the other leg : tangent of its oppofite angle.

Demonftration: Let E D A F G (plate CCLXXXIV. fig. 2. n° 1.) reprefent the eighth part of a fphere, where the quadrantal planes E D F G, E D B C, are both perpendicular to the quadrantal plane A D F B; and the quadrantal plane A D G C is perpendicular to the plane E D F G; and the fpherical triangle A B C is right-angled at B, were C A is the hypothenufe, and B A, B C, are the legs.

To the arches G F, C B, draw the tangents H F, O B, and the fines G M, C I, on the radii D F, D B; alfo draw B L the fine of the arch A B, and C K the fine of A C; and then join I K and O L. Now H F, O B, G M, C I, are all perpendicular to the plane A D F B. And H D, G K, O L, lie all in the fame plane A D G C. Alfo F D, I K, B L, lie all

in the ſame plane A D G C. Therefore, the right-angled triangles H F D, C I K, O D L, having the equal angles H D F, C K I, O L B, are ſimilar. And C K : D G :: C I : G M; that is, as the ſine of the hypothenuſe : rad. :: ſine of a leg : ſine of its oppoſite angle. For G M is the ſine of the arc G F, which meaſures the angle C A B. Alſo, L B : D F :: B O : F H; that is, as the ſine of a leg : rad. :: tang. of the other leg : tang. of its oppoſite angle. Q. E. D.

Hence it follows, that the ſines of the angles of any oblique ſpherical triangle A C D (*ibid.* n° 2.) are to one another, directly, as the ſines of the oppoſite ſides.

Hence it alſo follows, that, in right-angled ſpherical triangles, having the ſame perpendicular, the ſines of the baſes will be to each other, inverſely, as the tangents of the angles at the baſes.

Theorem 2. In any right-angled ſpherical triangle A B C (*ibid.* n° 3.) it will be, as radius is to the co-ſine of one leg, ſo is the co-ſine of the other leg to the co-ſine of the hypothenuſe.

Hence, if two right-angled ſpherical triangles A B C, C B D (*ibid.* n° 2.) have the ſame perpendicular B C, the co-ſines of their hypothenuſes will be to each other, directly, as the co-ſines of their baſes.

Theorem 3. In any ſpherical triangle it will be, as radius is to the ſine of either angle, ſo is the co-ſine of the adjacent leg to the co-ſine of the oppoſite angle.

Hence, in right-angled ſpherical trangles, having the ſame perpendicular, the co-ſines of the angles at the baſe will be to each other, directly, as the ſines of the vertical angles.

Theorem 4. In any right-angled ſpherical triangle it will be, as radius is to the co-ſine of the hypothenuſe, ſo is the tangent of either angle to the co-tangent of the other angle.

As the ſum of the ſines of two unequal arches is to their difference, ſo is the tangent of half the ſum of thoſe arches to the tangent of half their difference: and, as the ſum of the co-ſines is to their difference, ſo is the co-tangent of half the ſum of the arches to the tangent of half the difference of the ſame arches.

Theorem 5. In any ſpherical triangle A B C (*ibid.* n° 4. and 5.) it will be, as the co-tangent of half the ſum of the two ſides is to the tangent of half their difference, ſo is the co-tangent of half the baſe to the tangent of the diſtance (D E) of the perpendicular from the middle of the baſe.

Since the laſt proportion, by permutation, becomes co-tang. $\frac{AC+BC}{2}$ : co-tang. A E :: tang. $\frac{AC-BC}{2}$ : tang. D E, and as the tangents of any two arches are, inverſely, as their co-tangents; it follows, therefore, that tang. A E : tang. $\frac{AC+BC}{2}$ :: tang. $\frac{AC-BC}{2}$ : tang. D E; or, that the tangent of half the baſe is to the tangent of half the ſum of the ſides, as the tangent of half the difference of the ſides to the tangent of the diſtance of the perpendicular from the middle of the baſe.

Theorem 6. In any ſpherical triangle A B C (*ibid.* n° 4.) it will be, as the co-tangent of half the ſum of the angles at the baſe, is to the tangent of half their difference, ſo is the tangent of half the vertical angle to the tangent of the angle which the perpendicular C D makes with the line C F biſecting the vertical angle.

The

The Solution of the Cases of right-angled spherical Triangles, (*ibid.* n° 3.)

| Case | Given | Sought | Solution |
|---|---|---|---|
| 1 | The hyp. A C and one angle A | The opposite leg B C | As radius : sine hyp. A C : : sine A : sine B C (by the former part of theor. 1.) |
| 2 | The hyp. A C and one angle A | The adjacent leg A B | As radius : co-sine of A : : tang. A C : tang. A B (by the latter part of theo. 1.) |
| 3 | The hyp. A C and one angle A | The other angle C | As radius : co-sine of A C : : tang. A : co-tang. C (by theorem 4.) |
| 4 | The hyp. A C and one leg A B | The other leg B C | As co-sine A B : radius : : co-sine A C : co-sine B C (by theorem 2.) |
| 5 | The hyp. A C and one leg A B | The opposite angle C | As sine A C : radius : : sine A B : sine C (by the former part of theorem 1.) |
| 6 | The hyp. A C and one leg A B | The adjacent angle A | As tang. A C : tang. A B : : radius : co-sine A (by theorem 1.) |
| 7 | One leg A B and the adjacent angle A | The other leg B C | As radius : sine A B : : tangent A : tangent B C (by theorem 4.) |
| 8 | One leg A B and the adjacent angle A | The opposite angle C | As radius : sine A : : co-sine of A B : co-sine of C (by theorem 3.) |
| 9 | One leg A B and the adjacent angle A | The hyp. A C | As co-sine of A : radius : : tang. A B : tang. A C (by theorem 1.) |
| 10 | One leg B C and the opposite angle A | The other leg A B | As tang. A : tang. B C : : radius : sine A B (by theorem 4.) |
| 11 | One leg B C and the opposite angle A | The adjacent angle C | As co-sine B C : radius : : co-sine of A : sin. C (by theorem 3.) |
| 12 | One leg B C and the opposite angle A | The hyp. A C | As sin. A : sin. B C : : radius : sin. A C (by theorem 1.) |
| 13 | Both legs A B and B C | The hyp. A C | As radius : co-sine A B : : co-sine B C : co-sine A C (by theorem 2.) |
| 14 | Both legs A B and B C | An angle, suppose A | As sine A B : radius : : tang. B C : tang. A (by theorem 4.) |
| 15 | Both angles A and C | A leg, suppose A B | As sine A : co-sine C : : radius : co-sine A B (by theorem 3.) |
| 16 | Both angles A and C | The hyp. A C | As tang. A : co-tang. C : : radius : co-sine A C (by theorem 4.) |

Note, The 10th, 11th, and 12th cases are ambiguous; since it cannot be determined by the data, whether A B, C, and A C, be greater or less than 90 degrees each.

The Solution of the Cases of oblique spherical Triangles, (*ibid.* n° 4 and 5.)

| Case | Given | Sought | Solution |
|---|---|---|---|
| 1 | Two sides A C, B C, and an angle A opposite to one of them. | The angle B opposite to the other | As sine B C : sine A : : sine A C : sine B (by theor. 1.) Note, this case is ambiguous when B C is less than A C; since it cannot be determined from the data whether B be acute or obtuse. |
| 2 | Two sides A C, B C, and an angle A opposite to one of them. | The included angle A C B | Upon A B produced (if need be) let fall the perpendicular C D : then (by theor. 4.) rad. : co-sine A C : : tang. A : co-tang. A C D; but (by theor. 1.) as tang. B C : tang. A C : : co-sine A C D : co-sine B C D. Whence A C B = A C D ± B C D is known. |

| Caſe | Given | Sought | Solution |
|---|---|---|---|
| 3 | Two fides A C, B C, and an angle oppofite to one of them | The other fide A B | As rad. : co-fine A : : tang. A C : tang. A D (by theor. 1.) and (by theor. 2.) as co-fin. A C : co-fin. B C : : co-fin. A D : co-fin. B D. Note, this and the laft cafe are both ambiguous when the firft is fo. |
| 4 | Two fides A C, A B, and the included angle A | The other fide B C | As rad. : co-fin. A : : tang. A C : tan. A D (by theor. 1.) whence B D is alfo known : then (by theor. 2.) as co-fine A D : co-fine B D : : co-fine A C : co-fine B C. |
| 5 | Two fides A C, A B, and the included angle A | Either of the other angles, fuppofe B | As rad. : co-fine A : : tang. A C : tan. A D (by theorem 1.) whence B D is known : then (by theor. 4.) is fine B D: fine A D : : tan. A : tan. B. |
| 6 | Two angles A, A C B, and the fide A C betwixt them | The other angle B | As rad. : co-fine A C : : tang. A : co-tang. A C D (by theor. 4.) whence B C D is alfo known : then (by theor. 3.) as fine A C D : fine B C D : : co-fine A : co-fine B. |
| 7 | Two angles A, A C B, and the fide A C betwixt them | Either of the other fides, fuppofe B C | As rad. : co-fine A C : : tang. A : co-tang. A C D (by theo. 4.) whence B C D is alfo known : then, as co-fine B C D: co-fine A C D : : tang. A C : tang. B C (by theor. 1.) |
| 8 | Two angles A, B, and a fide A C oppofite to one of them | The fide B C oppofite the other | As fine B : fine A C : : fine A : fine B C (by theorem 1.) |
| 9 | Two angles A, B, and a fide A C oppofite to one of them | The fide A B betwixt them | As rad. : co-fine A : : tang. A C : tan. A D (by theor. 1.) and as : tang. B: tang. A : : fine A D : fine B D (by theor. 4.) whence A B is alfo known. |
| 10 | Two angles A, B, and a fide A C oppofite to one of them | The other angle A C B | As rad. : co-fine A C : : tang. A : co-tang. A C D (by theor. 4.) and as co-fine A : co-fine B : : fine A C D: fine B C D (by theor. 3.) whence A C B is alfo known. |
| 11 | All the three fides A B, A C, and B C | An angle, fuppofe A | As tang. $\frac{1}{2}$ A B : tang. $\frac{AC+BC}{2}$ : : tang. $\frac{AC-BC}{2}$ : tang. D E, the diftance of the perpendicular from the middle of the bafe (by theor. 6.) whence A D is known : then, as tang. A C : tang. A D : : rad. : co-fine A (by theorem 1.) |
| 12 | All the three angles A, B, and A C B | A fide, fuppofe A C | As co-tan. $\frac{ABC+A}{2}$ : tan. $\frac{ABC-A}{2}$ : : tang. $\frac{ACB}{2}$ : tang. of the angle included by the perpendicular and a line bifecting the vertical angles ; whence A C D is alfo known : then (by theor. 5.) tang. A : co-tang. A C D : : rad. co-fine A C. |

Note, in letting fall your perpendicular, let it always be from the end of a given ſide, and oppoſite to a given angle.

TRILLION, in arithmetic, a billion of billions. See NUMERATION.

TRILLO, in muſic, the ſame with cadence. See the article CADENCE.

TRIM *of a ſhip*, her beſt poſture, proportion of ballaſt, and hanging of her maſts, *&c.* for ſailing. To find the trim of a ſhip, is to find the beſt way of making her ſail ſwiftly, or how ſhe will ſail beſt. This is done by eaſing of her maſts and ſhrouds; ſome ſhips ſailing much better when they are ſlack, than when they are taut or faſt: but this depends much upon experience and judgment, and the ſeveral trials and obſervations which the commander and other officers may make aboard.

TRIMACRUS, or TRIMACER, a foot, in antient poetry, the ſame with the moloſſus. See MOLOSSUS and FOOT.

TRIMMERS, in architecture, pieces of timber framed at right-angles to the joints, againſt the ways for chimneys, and well-holes for ſtairs.

TRINE, in aſtrology, the aſpect or ſituation of one ſtar with regard to another, when they are diſtant 120 degrees: it is noted with this character △.

TRING, a market-town of Hertfordſhire, twenty-four miles weſt of Hertford.

TRINGA, in ornithology, a genus of birds belonging to the order of the ſcolopaces, the characters of which are theſe: the beak is of a cylindric figure, obtuſe at the extremity, and in length about equal to the toes: the feet have each four toes, and they are connected.

To this genus belongs the ruff, the cinclus, the lapwing, the godwit, the tolk, grey plover, *&c.* See the articles RUFF, CINCLUS, *&c.*

TRINGLE, in architecture, a name common to ſeveral little ſquare members or ornaments, as reglets, liſtels, and platbands.

TRINGLE is more particularly uſed for a little member fixed exactly over every triglyph, under the plat-band of the architrave, from whence the guttæ or pendant drops hang down.

TRINIDAD, or TRINITY-ISLAND, is ſituated in the Atlantic or American ocean, between 60° and 62° of weſt longitude, and between 9° and 11° of north latitude; it is about ninety miles long, and ſixty broad.

TRINIDAD, a port-town of Mexico, in America, ſituated in the province of Guatimala, an hundred and twenty miles ſouth-eaſt of the city of Guatimala: weſt long. 94°, north lat. 13°.

TRINITARIANS, thoſe who are orthodox and believe in the trinity: thoſe who do not believe therein, being called anti-trinitarians.

Trinitarians alſo denote an order of religious inſtituted at Rome in the year 1198, under the pontificate of Innocent III. the founders whereof were John de Matha, and Felix de Valois. His holineſs gave them permiſſion to eſtabliſh this order for the deliverance of captives, who groaned under the tyranny of the infidels: he gave them, as a habit, a white gown ornamented with a red and blue croſs. After the death of the two founders, pope Honorius III. continued the order, and their rule was approved by his ſucceſſor Clement IV. in 1267. At firſt they were not permitted to eat fleſh, and, when they travelled, were to ride only upon aſſes. But their rule was corrected and mitigated by the biſhop of Paris, and the abbots of St. Victor and St. Genevieve, who allowed them to eat any kind of food, and to uſe horſes. This order poſſeſſes about two hundred and fifty convents in thirteen different provinces: ſix of which are in France; namely, France, Normandy, Picardy, Champaine, Languedoc, and Provence; three in Spain, *viz.* New Caſtile, Old Caſtile, and Arragon; one is in Italy, and one in Portugal. There was formerly the province of England, where this order had forty-three houſes; that of Scotland, where it had nine; and that of Ireland, where it had fifty-two; beſides a great number of monaſteries in Saxony, Hungary, Bohemia, and other countries. The convent of Cerfroy in France is head of the order.

There are alſo nuns of the trinitarian order eſtabliſhed in Spain, by John de Matha himſelf, who built them a convent in 1201, under the direction of the infanta Conſtantia, daughter of Peter II. king of Arragon, who was the firſt religious, and the firſt ſuperior of that order. And, in 1612, Frances de Romero, daughter of Julian de Romero, lieutenant-general of the ſpaniſh army, founded a convent of barefooted trinitarian-nuns at Madrid.

TRINITY, *trinitas*, in theology, the ineffable myſtery of three perſons in one God; Father, Son, and Holy Spirit. See the article GOD, *&c.*

The

The doctrine of the trinity, as professed in the christian church, is as follows: that there is but one God in three distinct persons, Father, Son, and Holy Ghost; *person* signifying the same as *essence*, with a particular manner of subsistance, which the Greek fathers call hypostasis, taking it for the incommunicable property that makes a person. The Father, Son, and Holy Ghost are believed to be three distinct persons in the divine nature, because the scriptures, in speaking of these three, distinguish them from one another, as we use in common speech to distinguish three several persons. There are many instances to this purpose; particularly the form of administring the sacrament of baptism, which runs in the name of the Father, the Son, and the Holy Ghost: and that solemn benediction, with which St. Paul concludes his second epistle to the Corinthians: "The grace of our Lord Jesus "Christ, &c." and the three witnesses in heaven, mentioned by St. John. Each of these three persons are affirmed to be God, because the names, properties, and operations of God are, in the holy scripture, attributed to each of them.

The divinity of the Father is undisputed. That of the Son is proved from the following texts, among many others. St. John says, "The Word was God;" St. Paul, "That God was manifested in the flesh; that Christ is over all, God blessed for ever." Eternity is attributed to the Son: "the Son hath life in himself:" perfection of knowledge: "as the Father knoweth me, so know I the Father." And we are commanded, "To honour the Son, as we honour the Father." The divinity of the Holy Ghost rests upon the following proofs, among others: Lying to the Holy Ghost, is called "lying to God:" because Christians are the temples of the Holy Ghost, they are said to be the "temples of God." "His teaching all things; his guiding into all truth; his telling things to come; his searching all things, even the deep things of God, &c." are adduced as plain characters of his divinity. Besides, he is joined with God the Father, as an object of faith and worship, in baptism, and the apostolical benediction. Many of the heathens seem to have had a notion of the trinity in the Godhead; Plato and his followers speak of it in such terms, that the primitive fathers have been accused of borrowing the doctrine itself from the platonic school. This point is treated at large in Cudworth's Intellectual System.

The several anti-trinitarian heresies may be seen under their respective articles. See ARIANS, SABELLIANS, SOCINIANS, &c.

TRINITY-SUNDAY, a festival of the christian church, observed on the Sunday next after Whitsunday, in honour of the holy and undivided trinity. The observation of this festival was first enjoined in the council of Arles, *anno* 1260.

TRINITY-HOUSE, a kind of college at Deptford, belonging to a company or corporation of seamen, who, by the king's charter, have power to take cognizance of those persons who destroy sea-marks; and to get reparation of such damages; and to take care of other things belonging to navigation. At present, many gentry and some nobility are members of that community.

The master, wardens, and assistants of the trinity-house, may set up beacons, and marks for the sea, in such places, near the coasts or forelands, as to them shall seem meet. By a statute of queen Elizabeth, no steeple, trees, or other things standing as sea-marks, shall be taken away or cut down, upon pain that every person guilty of such offence, shall forfeit 100 l. and if the person offending be not possessed of the value, he shall be deemed convict of outlawry.

*Fraternity of the* TRINITY, a religious society instituted at Rome by St. Philip Neri, in 1548. These religious were appointed to take care of the pilgrims who came to visit the tombs of St. Peter and St. Paul. The society originally consisted of only fifteen religious, who assembled on the first Sunday of every month, in the church of St. Saviour del Campo, to hear the exhortations of the founder; after whose death pope Paul IV. gave the fraternity the church of St. Benedict, near which they have since built a large hospital, for the reception of pilgrims. The fraternity is one of the most considerable in Rome, and most of the nobility of both sexes have been members thereof.

TRINOMIAL, or TRINOMIAL ROOT, in mathematics, is a root consisting of three parts connected together by the signs + or —, as $x + y + z$, or $a + b - c$. See BINOMIAL and ROOT.

TRINQUIMALE, a port-town of the island of Ceylon, situated on the north-east

east part of the island: east long. 80°, north lat. 9°.

TRIO, in music, a part of a concert wherein three persons sing; or more properly a musical composition consisting of three parts. Trios are the finest kinds of composition, and these are what please most in concerts.

RIOCLITE, in astrology, an aspect or situation of two planets with regard to the earth, when they are three octants or eight parts of a circle, *i. e.* 135° distant from each other. This aspect, which some call the sesquiquadrans, is one of the new aspects superadded to the old ones by Kepler.

TRIONES, in astronomy, a sort of constellation or assemblage of several stars in the ursa minor, commonly called Charles's wain. See the article Ursa.

TRIONUM, in botany, a genus of the monadelphia-polyandria class of plants, the corolla whereof consists of five patent petals, vertically cordated, and united together at the base: the fruit is an ovated quinquangular capsule, consisting of five cells, and containing five valves: the seeds are numerous, and kidney-shaped.

TRIOPTERIS, in botany, a genus of the decandria-trigynia class of plants, the corolla whereof consists of six oval, erecto-patulous, equal and permanent petals, surrounded by three others smaller than themselves, but equal to one another: there is no pericarpium: the seeds are three, erect and carinulated at the back; each of them has externally at its base an ala, and at its apex two; these ala are what in the flowering state of the plant appear to be petals, but they are not truly such.

TRIOURS, in law, are such persons as are chosen by the court to examine whether a challenge made to the whole panel of jurors, or any part of them, be just or not.

TRIP, a sea-term. A ship is said to bear her top-sails a-trip, when she carries them hoisted up to the highest.

TRIPARTITE, *tripartitus*, something divided into three parts, or made by three parties, as indenture tripartite, *&c.*

TRIPARTITION, a division by three, or the taking the third part of any number or quantity.

TRIPELAS, in natural history, earths composed of apparently similar particles, naturally dry, and of rough dusty surfaces, but somewhat more firmly coherent than the ochres, composed of fine but hard particles, and not readily diffusible in water. Of this genus of earths authors make five species, which may be reduced to the yellowish and the reddish; for an account of which, see the article Tripoli.

TRIPENTAHÆDRIA, in natural history, the name of a genus of spars, composed of thrice five planes, being made of a pentangular column, terminated at each end by a pentangular pyramid. Of this genus we have only one species: this has a moderately long column, and very short and broad pyramids; it is found in Derbyshire, Yorkshire, and Cornwall, and is frequent about Gosselaer, in Saxony.

TRIPHTHONGUE, in grammar, an assemblage or concourse of three vowels in the same syllable, as *quæ*.

TRIPLE, threefold. See the article Ratio and *Sub*-Triple.

Triple, in music, is one of the species of measure or time. See the articles Time and Measure.

Triple-time consists of many different species, whereof there are in general four, each of which has its varieties. The common name triple is taken hence, that the whole half of the bar is divisible into three parts, and is beaten accordingly. The first species is called the simple triple, wherein the measure is equal to three semibreves, three minims, three crotchets, three quavers, or three semiquavers, which are marked thus, $\frac{3}{1}\ \frac{3}{2}\ \frac{3}{4}\ \frac{3}{8}\ \frac{3}{16}$, but the last is not much used, except in church music. In all these the measure is divided into three equal parts or times, called thence triple-time, or the measure of three times; whereof two are beat down, and the third up. The second species is the mixed triple; its measure is equal to six crotchets, or six quavers, or six semiquavers, and accordingly is marked $\frac{6}{4}$ or $\frac{6}{8}$ or $\frac{6}{16}$; but the last is seldom used. The measure here is usually divided into equal parts or times, whereof one is beat down and one up; but it may also be divided into six times, whereof the first two are beat down and the third up, then the next two down and the last up; *i. e.* each half of the measure is beat like the simple triple (on which account it may be called the compound triple) and because it may be thus divided either into two or six times (*i. e.* two triples) it is called mixed, and by some the measure of six times. The third species is the compound triple, consisting of nine crotchets or

or quavers, or femiquavers, marked $\frac{9}{4}\frac{9}{8}\frac{9}{16}$, the firft and laft are little ufed; fome alfo add $\frac{9}{1}\frac{9}{2}$, which are never ufed; fome add alfo other two, *viz.* fix femibreves and fix minims, marked $\frac{6}{1}$ or $\frac{6}{2}$, but thefe are not in ufe. This meafure is divided into three equal parts or times, whereof two are beat down and one up; or each third part may be divided into three times, and beat like the fimple triple, on which account it is called the meafure of the nine times. The fourth fpecies is a compound meafure of the fecond fpecies, containing twelve crotchets or quavers, or femiquavers, marked $\frac{12}{4}\frac{12}{8}\frac{12}{16}$, to which fome add $\frac{12}{1}$ and $\frac{12}{2}$, which are never ufed; nor are the firft and third much ufed; efpecially the latter. The meafure here may be divided into two times, and beat one down and one up; or each half may be divided and beat as the fecond fpecies, either by two or three, in which cafe it will make in all twelve times; and hence it is called the meafure of twelve times. The french and italian authors make a great many more fpecies and divifions of triple-time, unknown, or at leaft unregarded, by our englifh muficians, and therefore not neceffary to be dwelt on here.

TRIPLICATE RATIO, the ratio which cubes bear to one another. See CUBE. This ratio is to be diftinguifhed from triple ratio, and may be thus conceived. In the geometrical proportions 2, 4, 8, 16, 32, as the ratio of the firft term (2) is to the third (8) duplicate of that of the firft to the fecond, or of the fecond to the third, fo the ratio of the firft to the fourth is faid to be triplicate of the ratio of the firft to the fecond, or of that of the fecond to the third, or of that of the third to the fourth, as being compounded of three equal ratios. See the article RATIO.

TRIPLICATION, *triplicatio*, in the civil law, the fame with fur-rejoinder. See the article SUR-REJOINDER.

TRIPLICITY, or TRIGON, among aftrologers, is a divifion of the figns according to the number of the elements, each divifion confifting of three figns. Triplicity is frequently confounded with trine afpect, though ftrictly fpeaking the two are very different things; as triplicity is only ufed with regard to the figns, and trine, on the contrary, with regard to the planets. The figns of triplicity are thofe which are of the fame nature, and not thofe which are in trine afpect. Thus leo, fagittarius, and aries, are figns of triplicity, becaufe thofe figns are by thefe writers all fuppofed fiery.

TRIPOD, *tripos*, in antiquity, a famed facred feat or ftool, fupported by three feet, whereon the priefts and fibyls were placed to render oracles. It was on the tripod that the gods were faid to infpire the Pythians with that divine fury and enthufiafm wherewith they were feized at the delivery of their predictions.

TRIPOLI, a ftate of Africa, which including Barca, is bounded by the Mediterranean-fea on the north, by Egypt on the eaft, by Nubia and Bildulgerid on the fouth, and by Tunis on the weft; extending along the fhore of the Mediterranean from the north-weft to the fouth-eaft about a thoufand miles, but fcarce two hundred miles broad in any place. The city of Tripoli, being the capital of this ftate, is furrounded with a wall and other fortifications: eaft long. 14° 30′, north lat. 33° 30′.

TRIPOLI is alfo a port-town of Syria, fituated on the Levant, being the chief town of that part of Syria antiently called Phœnicia, fituated at the foot of mount Libanus: eaft long. 36° 15′, north lat. 34° 40′.

TRIPOLI, in natural hiftory, the name of an earthy fubftance which is a fpecies of the tripelas. See the article TRIPELAS. This earth is much ufed by the lapidaries to polifh ftones, and by the brafiers, and other the like artifts, to clean metalline veffels. It is of two kinds, the yellowifh, and reddifh-white; the yellowifh-white kind is called by authors alana gleba, tripolis and terra tripolitana; this is the produce of Germany, Saxony, and France; there is alfo of it in the neighbourhood of Venice, but it is found in greateft plenty in many parts of Africa. It is found a dry hard earth of a very pale yellowifh-white, of a firm texture, and moderately heavy; it is fometimes found of itfelf, conftituting a ftratum; but it is more frequently met with in detached pieces among ftrata of other matter. It is of a rough, irregular, dufty furface; it adheres flightly to the tongue, is dry, hard, and harfh to the touch, is not to be broken between the fingers, and flightly ftains the hands: it makes no effervefcence with aqua fortis, and makes a flight hiffing noife on being thrown into water. The reddifh tripoli is of our own production, though not peculiar to our country; it is found

in

in great abundance on Mendip-hills in Somerfetfhire, and not lefs plentifully in many parts of Germany. This is well known in the fhops as a fubftance of great ufe in polifhing brafs, but is not applied to any of the other ufes of the yellowifh kind: this, like the former, is moft frequently found in detached maffes, and while in the earth is tolerably foft, and eafily falls into flakes. When dry it becomes of a confiderable hardnefs, and is of a fine pale reddifh-white, of a loofe open texture, compofed of a multitude of extremely thin plates or flakes laid evenly on one another, and confiderably heavy; it is of a fmooth and fomewhat gloffy furface; it adheres very firmly to the tongue, is dry and harfh to the touch, too hard to be broken between the fingers, and does not ftain the hands: it makes no effervefcence with acids, and burns to a paler colour, with fome additional hardnefs.

TRIPPING, in heraldry, denotes the quick motion of all forts of deer, and of fome other creatures, reprefented with one foot as it were on a trot.

TRIPTOTES, *triptota*, in grammar, defective nouns which have only three cafes; fuch is *mele*, *tempe*, *grates*, *prece*, *&c.*

TRIQUIER, a port-town of France, in the province of Britanny, fituated on the englifh channel, fifty miles weft of St. Malo.

TRIQUETROUS, among botanifts, expreffes a fruit or leaf that has three fides or faces all flat. This leaf is ufually fubulated, or grows gradually fmaller from the bafe to the point.

TRIREME, or TRIREMIS, in antiquity, a gally with three ranks of oars on a fide.

TRISECTION, or TRISSECTION, the dividing a thing into three. The term is chiefly ufed in geometry, for the divifion of an angle into three equal parts. The trifection of an angle geometrically, is one of thofe great problems whofe folution has been fo much fought by mathematicians for thefe two thoufand years, being in this refpect on a footing with the quadrature of the circle, and the duplicature of the cube angle.

TRISMEGISTUS, an epithet or furname given to one of the two Hermefes, or Mercuries, kings of Thebes in Egypt, who is faid to be contemporary with Mofes.

TRISOLYMPIONICA, among the antients, a perfon who had thrice borne away the prize at the olympic games; thefe had great privileges and honours paid them. See OLYMPIC-GAMES.

TRISPAST, *trifpafton*, in mechanics, a machine with three pullies, or an affemblage of three pullies for raifing of great weights. See the article PULLY.

TRISYLLABLE, or TRISSYLLABLE, in grammar, a word confifting of three fyllables.

TRITE, in mufic, the third mufical chord in the fyftem of the antients. See the article CHORD.

TRITICEA, the name whereby fome authors call the triticum. See the next article.

TRITICUM, in botany, a genus of the triandria-digynia clafs of plants, the corolla whereof confifts of two valves, nearly equal in fize, and of the bignefs of thofe of the cup. The exterior valve is bellied with an obtufe end, terminated by a point; the interior valve is plane. The corolla ferves inftead of a pericarpium, inclofing the feed, which is fingle, obtufe, and furrowed on one fide.

This genus comprehends the common wheat, the fpelt-corn, and couch-grafs. See the article WHEAT, *&c.*

TRITON, in ichthyology, a genus of fifh, the body of which is oblong, the roftrum at the mouth of a fpiral form, the tentacula fourteen in number, and twelve of them cheliferous.

TRITON, in poetry, a fea-demi-god, held by the antients to be an officer or trumpeter of Neptune, attending on him, and carrying his orders and commands from fea to fea.

The poets reprefent him as a half man, half fifh, terminating in a dolphin's tail, and bearing in one hand a fea-fhell, which ferves as a trumpet. Some of the antients make him the Son of Neptune and the nymph Salacia; Hefiod, of Neptune and Amphitrite; Neumenius, in his book de Pifcationibus, makes him the fon of Oceanus and Tethys; and Lycophron, the fon of Nereus. But, though Hefiod and the mythologifts only fpeak of one Triton, the poets have imagined feveral, giving fome of them for trumpeters to all the fea-gods, particularly to Neptune and Venus; accordingly they were frequently introduced on the antient theatres, in the Naumachia.

TRITONE, *tritono*, in mufic, a falfe concord confifting of three tones, or a greater third and a greater tone.

Its ratio or proportion in numbers is of 45 to 32. In dividing the octave we

find on one fide the falfe fifth, and the tritone on the other.

The tritone is a kind of redundant fourth, confifting of three tones, whence its name; or more properly of two tones, with a greater femi-tone and a leffer, as of *ut* to *fa*, fharp; of *fa* to *fi*, flat, *&c*. But it is not, as many imagine, a greater fourth, for the fourth is a perfect interval, which does not admit of any majority or minority; nor muft the tritone be confounded with the falfe fifth, for the tritone only comprehends four degrees, *viz. ut, re, mi, fa*, fharp; whereas the falfe fifth comprehends five, *viz. fa*, fharp, *fol, la, fi, ut*: befides, that among the fix femi-tones which compofe the tritone cromatically, there are three greater and three leffer; whereas, among the fix femi-tones which compofe the falfe fifth, there are only two leffer and four greater.

TRITURATION, *tritura*, in pharmacy, the act of reducing a folid body into a fubtile powder; called alfo levigation and pulverization. See the articles LEVIGATION and PULVERIZATION.

This is principally employed to reduce hard fubftances to fine powders, either by the mortar, or by way of levigation on a marble: there is little difficulty in this, befides the labour. Trituration has a great fhare in fome inftances, in raifing or depreffing the efficacy of what comes under its management; for in grinding all thofe bodies, whofe efficacy confifts in the peculiar fhape and points of their component parts, the more and finer they are broke, the lefs they will operate: thus may calomel be rendered much gentler, and made capable of being given in much larger quantities, only by long rubbing in a glafs mortar; for the continual triture has the fame effect upon it, as repeated fublimation, which is only breaking of the faline fpicula more and more, until it becomes almoft plain mercury. But in refinous fubftances, particularly thofe which are purgative, as jalap, fcammony, *&c.* the finer the powder they are reduced into, the greater their efficacy is likely to be. As the fenfe which the ftomach and bowels have of them, is in proportion to their contacts, therefore the more the fame quantity is divided, the farther will it diffufe itfelf, and vellicate the fibres; that is, in other words, it will work the more.

TRITURATION is alfo ufed in medicine for the action of the ftomach on the food, whereby it is fitted for nourifhment. See the article DIGESTION.



TRIVENTO, a town of Italy, in the kingdom of Naples, and principality of Molife, fituated fifty-five miles north eaft of Naples.

TRIUMFETTA, in botany, a genus of the polyandria-digynia clafs of plants, the corolla of which confifts of five linear, erect, obtufe petals, hollowed, deciduous, and bent backwards; the point is prominent below the apex; the fruit is a globofe capfule, every where furrounded with hooked prickles, and contains four cells; the feeds are two, convex on one fide and angular on the other: but only one of the two feeds of each cell ufually ripens.

TRIUMPH, in roman antiquity, a public and folemn honour conferred by the Romans on a victorious general, by allowing him a magnificent entry into the city. The triumph was of two kinds, the leffer, and greater, the firft of which is the fame with the ovation. See OVATION.

The greater triumph, called alfo curulis, or fimply the triumph, was decreed by the fenate to a general, upon the conquering of a province, or gaining a fignal victory. The day appointed for the ceremony being arrived, fcaffolds were erected in the forum and circus, and all the other parts of the city, where they could beft behold the pomp: the fenate went to meet the conqueror without the gate called capena or triumphalis, and marched back in order to the capitol; the ways being cleared and cleanfed by a number of officers and tipftaffs, who drove away fuch as thronged the paffage, or ftraggled up and down. The general was clad in a rich purple robe, interwoven with figures of gold, fetting forth his great exploits; his bufkins were befet with pearl, and he wore a crown, which at firft was only laurel, but afterwards gold; in one hand he bore a branch of laurel, and in the other a truncheon. He was drawn in a magnificent chariot, adorned with ivory and plates of gold, drawn ufually by two white horfes; though fometimes by other animals, as that of Pompey, when he triumphed over Africa, by elephants; that of Marc Antony, by lions; that of Heliogabalus, by tygers; that of Aurelian, by deer, *&c.* His children were at his feet, and fometimes on the chariot-horfes. The proceffion was led up by the muficians, who played triumphal pieces, in praife of the general; thefe were followed

followed by young men, who led the victims to the facrifice, with their horns gilded, and their heads adorned with ribbands and garlands; next came the cars and waggons, loaded with all the fpoils taken from the enemy, with their horfes, chariots, &c. thefe were followed by the kings, princes, and generals, who had been taken captives, loaden with chains: after thefe appeared the triumphal chariot, before which, as it paffed, they all along ftrewed flowers, and the people, with loud acclamations, called out *Io triumphe!* The chariot was followed by the fenate, clad in white robes; and the fenate by fuch citizens as had been fet at liberty or ranfomed: and the proceffion was clofed by the priefts and their officers and utenfils, with a white ox led along, for the chief victim. In this order they proceeded through the triumphal gate, along the via facra, to the capitol, where the victims were flain. In the mean time all the temples were open, and all the altars loaded with offerings and incenfe; games and combats were celebrated in the public places, and rejoicings appeared every where.

TRIUMVIR, one of three perfons who govern abfolutely, and with equal authority, in a ftate. It is chiefly applied to the roman government: Cæfar, Pompey, and Craffus were the firft triumvirs, who divided the government amongft them. There were alfo other officers, called triumvirs; as the triumviri or trefviri capitales, who were the keepers of the public gaol; they had the office of punifhing malefactors; for which purpofe they kept eight lictors under them. There were alfo triumviri monetales, the mafters of the mint; whence the following mark is ftill extant on many antient coins, III VIRI. Sometimes they were ftyled triumviri A. A. Æ. F. F. thefe letters ftanding for auro, argento, ære, flando, feriendo. There were likewife nocturnal triumviri, inftituted to prevent or extinguifh fires in the night.

TRIUMVIRATE, an abfolute government adminiftred by three perfons, with equal authority. See the preceding article. There were two famous triumvirates at Rome; Pompey, Cæfar, and Craffus, as mentioned in the preceding article, eftablifhed the firft; and Auguftus, Marc Antony, and Lepidus, the fecond; which gave the laft blow to the roman republic, for Auguftus having vanquifhed Lepidus and Antony, the triumvirate funk into a monarchy.

TROCHAIC VERSE, in the latin poetry, a kind of verfe, fo called becaufe the trochees chiefly prevail, as the iambus does in the iambic. It generally confifts of feven feet and a fyllable; the odd feet, for the moft part, confift of trochees, though a tribrachys is fometimes admitted, except in the feventh foot: thefe two feet are likewife ufed in the other places, as is alfo the fpondæus, dactylus, and anapæftus. The following is an example.

1 2 3 4 5 6
*Solus | aut rex|aut po|eta|non quot |annis|*
7 ½
*nafci|tur.*

TROCHANTER, in anatomy, a name given to two apophyfes, fituated in the upper part of the thigh-bone: they receive the tendons of moft of the mufcles of the thigh. See the article FEMUR.

TROCHE, *trochifcus*, in pharmacy, a fort of medicine, made of glutinous fubftances, into little cakes, and afterwards exficcated. The four following rules are to be obferved in making of them: 1. The ingredients are to be reduced to a powder. 2. If the mafs proves fo glutinous as to ftick to the fingers in making up, the hands may be anointed with any convenient fweet or aromatic oil; or elfe fprinkled with powder of ftarch, or with that of liquorice. 3. In order to dry thoroughly the troches, put them on an inverted fieve, in a fhady airy place, and frequently turn them. 4. The troches are to be kept in glafs veffels, or in earthen ones well glazed. There are troches of various kinds, and for various intentions, as purgative, alterative, aperitive, corroborative, &c. The chief troches now in ufe are thofe of myrrh and liquorice, and thofe of the teftaceous powders for the heart-burn.

TROCHEE, *trochæus*, in the greek and latin poetry, a foot confifting of two fyllables, the firft long, and the fecond fhort, as in the words mūsă and sērvăt.

TROCHILUS, in architecture, a name ufed by the antients for what the moderns call fcotia. See the article SCOTIA.

TROCHILUS, in ornithology, the purple humming-bird. See HUMMING BIRD.

TROCHITÆ, in natural hiftory, a name given to the feparate joints of the entrochus. See the article ENTROCHUS.

TROCHLEA, one of the mechanical powers

powers, ufually called a pulley. See the article PULLEY.

TROCHLEARES, in anatomy, a name given to the oblique mufcles of the eye. See the article OBLIQUUS.

TROCHOID, in geometry, a curve more generally known by the name of cycloid. See the article CYCLOID.

TROCHUS, in the natural hiftory of fhell-fifh, a name given to feveral fpecies of the flat-mouthed cochlæ. See COCHLEA.

Thefe fhells have got the name trochus, from their refembling the figure of the top, with which boys play. See plate CCLXXXV. fig. 4. where n° 1. reprefents the rough trochus, n° 2. the wavy trochus, and n° 3. the fmooth trochus.

TROGLODYTES, in the antient geography, a people of Ethiopia, faid to have lived in caves under ground. Pom. Mela gives a ftrange account of the Troglodytes: he fays, they did not fo properly fpeak as fhriek, and that they lived on ferpents.

TROJA, a town of Italy in the kingdom of Naples, and province of the Capitinate, fituated fifty-five miles north-eaft of Naples.

TROJA, or TROJAN GAMES, were games faid to be inftituted by Afcanius, fon of Æneas, and afterwards kept up by the Romans with great folemnity. They were celebrated by companies of boys, neatly dreffed, and furnifhed with little arms and weapons, who muftered in the public circus. They were chofen, for the moft part, out of the nobleft families of Rome, and the captain of them had the honourable title of princeps juventutis, being fometimes next heir to the empire, and feldom lefs than the fon of a principal fenator. A particular account of thefe games may be feen in the fifth Æneid of Virgil, beginning at verfe 545.

TROIS RIVIERES, a town of North America, in the province of Canada, fituated on the river of St. Laurence, fifty miles fouth of Quebec: weft long. 75°, and north lat. 46° 45′.

TROKI, a town of Poland, in Lithuania, fituated on a lake, fifteen miles weft of Wilna: eaft long. 25°, and north lat. 55°.

TRONAGE, an antient cuftomary toll, paid for weighing of wool. This word is particularly mentioned in a charter granted to the mayor and citizens of London; in which city there is an officer called tronafor, whofe bufinefs it is to weigh the wool that is brought thither.

TRONCONNEE, in heraldry, denotes a crofs, or other thing, cut in pieces and difmembered, yet fo as all the pieces keep up the form of a crofs, though fet at a fmall diftance from one another.

TRONE WEIGHT, the fame with what we now call troy-weight. See WEIGHT.

TROOP, a fmall body of horfe or dragoons, about fifty or fixty, fometimes more, fometimes lefs; commanded by a captain. Each troop, befides a captain, has a lieutenant, cornet, quarter-mafter, and three corporals, who are the loweft officers of a troop.

*To beat the* TROOP, is the fame as beating the affembly. See ASSEMBLY.

TROPÆOLUM, the INDIAN CRESS, in botany, a genus of the octandria-monogynia clafs of plants, the flower of which confifts of five roundifh petals inferted into the divifions of the cup; the two upper petals are feffile; the three others have very long and barbated ungues; the fruit confifts of three convex capfules, fulcated and ftriated on one fide, and angular on the other; the feeds are three, gibbous on one fide, and angulated on the other, but upon the whole fomewhat roundifh, and ftriated deeply. See plate CCLXXXV. fig. 3.

This genus comprehends the cardamindum of authors.

TROPE, in rhetoric, a kind of figure of fpeech, whereby a word is removed from its firft and natural fignification, and applied with advantage to another thing, which it does not originally mean; but only ftands for it, as it has a relation to, or connection with it: as in this fentence, *God is my rock.* Here the trope lies in the word *rock*, which being firm and immoveable, excites in our minds the notion of God's unfailing power, and the fteady fupport which good men receive from their dependence upon him. See the article FIGURE.

Tropes are ufed for the fake of an agreeable variety; they divert the mind, and revive attention, when it begins to flag and be weary. In many cafes there is an abfolute neceffity for the writer or fpeaker to repeat the fame thing feveral times; therefore, to prevent the tirefome repetition of the fame words, he carefully diverfifies his expreffions, and judicioufly intermixes plain and figurative language. Tropes add a wonderful ornament and ftrength to a difcourfe, and often give the mind a brighter and ftronger idea of a thing, than proper words: Thus Virgil calling the two Scipios the

*thunder-*

*thunder-bolts of war*, reprefents the rapid fpeed and victorious progrefs of their arms more emphatically, than all the plain terms of the roman language could have done. In order to make ufe of tropes feafonably, and with advantage, the following rules fhould be obferved: 1. Be fparing and cautious in the ufe of them, and omit them when they are not either as plain as proper words, or more expreffive: tropes are the riches of a language, and it will be an imputation upon a man to lavifh them away without difcretion. 2. Care muft be taken, that tropes hold a proportion to the ideas intended to be raifed by them; there ought to be an eafy and unforced relation betwixt the trope and the proper word it is put for, or the thing intended to be expreffed by it: when there is not this fuitablenefs and relation, the expreffion at beft will not only be harfh and unpleafant, but often ridiculous and barbarous. In order to preferve this relation, a trope ought not to exprefs more or lefs than the thing requires; and things capable of heightening or ornament ought not to be debafed nor vilified by low expreffions; nor fmall matters over-magnified by pompous and fwelling words. 3. A trope ought to be obvious and intelligible, and therefore muft not be fetched from things too remote, fo as to require much reading and learning to apprehend it.

TROPEA, a town of Italy in the kingdom of Naples, and further Calabria, fituated on the Tufcan-fea, forty miles north of Reggio.

TROPES, a port-town of France, in Provence, fituated on the Mediterranean, thirty miles eaft of Toulon.

TROPHY, *tropæum*, among the antients, a pile or heap of arms of a vanquifhed enemy, raifed by the conqueror in the moft eminent part of the field of battle. The trophies were ufually dedicated to fome of the gods, efpecially Jupiter. The name of the deity to whom they were infcribed, was generally mentioned, as was that alfo of the conqueror. The fpoils were at firft hung upon the trunk of a tree; but inftead of trees, fucceeding ages erected pillars of ftone, or brafs, to continue the memory of their victories. To demolifh a trophy was looked upon as a kind of facrilege, becaufe they were all confecrated to fome deity.

The reprefentation of a trophy is often to be met with on medals of the roman emperors, ftruck on occafion of victories; wherein, befides arms and fpoils, are frequently feen one or two captives by the fides of the trophy.

TROPHY-MONEY, denotes certain money annually raifed in the feveral counties of the kingdom, towards providing harnefs, and maintaining the militia.

TROPICS, in aftronomy and geography, are two circles fuppofed to be drawn on each fide of the equinoctial, and parallel thereto. That on the north-fide of the line is called the tropic of cancer, and the fouthern tropic has the name of capricorn, as paffing through the beginning of thofe figns. They are diftant from the equinoctial 23° 29′. Two circles drawn at the fame diftance from the equator on the terreftrial globe, have the fame names in geography; and they include that fpace or part of the fphere, which is called the torrid zone, becaufe the fun is, at one time or other, perpendicular over every part of that zone, and extremely torrifies or heats it. See the article ZONE.

TROPPAW, a city of Silefia, feventy miles fouth of Breflaw.

TROT, in the manege, one of the natural paces of a horfe performed with two legs in the air, and two on the ground at the fame time crofs-wife, like St. Andrew's crofs, and continuing fo alternately to raife the hind-leg of the one fide, and the fore-leg of the other fide at once, leaving the other hind and fore-leg upon the ground, till the former come down. In this motion, the nearer the horfe takes his limbs from the ground, the opener, the evener, and fhorter his trot will be. If he takes up his feet flovenly, it is a fign of ftumbling and lamenefs; if he treads narrow or crofs, it betokens interfering or failing; if he treads long, it fhews over-reaching; if he fteps uneven, it befpeaks toil and wearinefs.

TROVER, in law, an action which a man hath againft one that, having found any of his goods, refufeth to deliver them upon demand.

TROUGH *of the fea*, is the hollow or cavity made between two waves or billows, in a rolling fea.

TROUSSEQUIN, in the manege, an arch of wood raifed above the hinder bow of a great faddle, in order to keep the bolfters firm.

TROUT, *trutta*, in ichthyology, the englifh name of feveral fpecies of falmo. See the article SALMO.

The

The common river-trout is, like the salmon, an inhabitant of the sea or rivers indifferently: it is spotted with red, and its lower jaw is somewhat the largest; its tail is not forked, but hollowed in form of an arch of a circle. It is a very beautiful fish, and is, with justice, greatly esteemed at our tables.

Besides this, there are species of salmo, known by the names of salmon-trout and lake-trout.

For the method of fishing for trout, see the article FISHING.

TROWBRIDGE, a market-town of Wiltshire, eighteen miles north-west of Salisbury.

TROY WEIGHT, in commerce. See the article WEIGHT.

TROYES, a city of Champaign, in France, situated on the river Seyne, seventy-miles south-east of Paris: east long. 4° 5', and north lat. 48° 15'.

TRUCE, in the art of war, denotes a suspension of arms, or a cessation of hostilities between two armies, in order to settle articles of peace, bury the dead, or the like.

TRUCHMAN, DRAGOMAN, or DROGMAN, in the countries of the Levant, signifies an interpreter. See DRAGOMAN.

TRUCKS, among gunners, round pieces of wood, in form of wheels, fixed on the axle-trees of carriages; to move the ordnance at sea, and sometimes also at land.

TRUE, something agreeable to the reality of things, or to truth.

TRUE *place of a planet*, or *star*, in astronomy, is a point of the heavens, shewn or pointed out by a right line, drawn from the center of the earth, through the center of the planet or star. See PLANET, *&c.*

TRUEN, or TRON, a town of the bishopric of Liege, in Germany, twenty miles south-east of Louvain.

TRUFFLES, *tubera terræ*, in natural history, a kind of subterraneous vegetable production, not unlike mushrooms, being a genus of fungi, which grows under the surface of the earth. See FUNGUS.

The truffle is only a fleshy tubercle, covered with a hard sort of crust, rough, and somewhat regularly furrowed, on the surface almost like the cypress-nut. It does not rise above the surface of the earth, but lies concealed about half a foot below it. Great numbers of them are found in the same place, of different sizes: some of them are now and then found of a pound weight, or even a pound and a quarter; these last are but rare, and Pliny only mentions their being of a pound weight.

They grow at the feet and under the shades of trees, sometimes about the roots of stones, and sometimes in clear earth. Their favourite trees are either the white or green oak, as the elm is that of the morellæ. They begin to be found when warm weather first succeeds the cold, sooner or later, as the season is more or less mild; for they have sometimes been very rare after hard winters. At first they appear only like little round peas, red without, and white within. These peas grow larger by degrees; from that time they take out of the ground what they commonly call white truffles; these are of themselves insipid, and people dry them as an ingredient for ragouts, because they keep better when dried, than marbled ones do. It is a common opinion, that truffles which have been once removed from their places, are never after capable of being nourished, even when put in some earth from which they were originally taken: but if one leave them there for a certain season, without disturbing them, they grow insensibly larger; their bark becomes black, rough, and unequal, though they always retain their whiteness within. Hitherto they have very little smell or taste, and can only be used in ragouts: these are always called the first white truffles, and are not to be made a different species from the marbled or black ones gathered in the end of autumn, and even in the winter after the frosts are begun.

When the truffles are at maturity, they have a very good smell and taste; and are fit to be dug from the month of October to the end of December; and sometimes to the end of February and March, when they are even at that time marbled; whereas those, gathered from the month of April till July and August, are only white. If people neglect to gather the truffles when arrived at a due degree of maturity, they rot; and then we may observe the reproduction of the truffle; because, after some time, we see several bunches of other young truffles filling up the places of the rotten ones. These young truffles are nourished till the first colds come on; and if the frosts are not intense, they get over the winter, and furnish us betimes with the fresh green truffles.

As to the virtues of truffles, the common opinion is, that they are hot: Galen, however, according to Matthiolus, looks upon

upon them as indifferent, and the basis of all other seasoning; and, indeed, it is to this purpose that they are used in all ragouts. Avicenna speaks of them in a manner quite different, and says, they engender thick humours more than any other food; that they are hard of digestion, heavy on the stomach, and, when much used, have a tendency to bring on an apoplexy and palsy. These two authors may be reconciled, if we consider two qualities in the truffle, which are capable of producing two different effects: first they may prove hot of themselves, by emitting their volatile salts into the stomach; or by being mixed with salt, pepper, and other spices, which they drink up like a sponge: In the second place they may prove of hard digestion, when eaten immoderately by a person of a weak stomach: in which case they produce bad effects, stagnate, and form themselves into a glareous substance, which disorders the stomach, and which may be occasioned by the cold quality ascribed to them by Galen. As a proof that the truffle is of hard digestion, it has this in common with other fruits, that it grows hard in spirit of wine, and is with difficulty dissolved in water.

TRUGILLO, a town of Terra Firma, in South America: west long. 69° 30′, and north lat. 7° 16′.

TRUMPET, a musical instrument, the most noble of all portable ones of the wind kind, used chiefly in war among the cavalry, to direct them in the service.

*Marine* TRUMPET, is a musical instrument consisting of three tables, which form its triangular body. It has a very long neck, with one single string, very thick, mounted on a bridge, which is firm on one side, but tremulous on the other. It is struck by a bow with one hand, and with the other the string is pressed, or stopped, on the neck by the thumb. It is the trembling of the bridge, when struck, that makes it imitate the sound of a trumpet; which it does to that perfection, that it is scarce possible to distinguish the one from the other: and this is what has given it the denomination of marine trumpet; though, in propriety, it is a kind of monochord.

*Harmonical* TRUMPET, an instrument that imitates the sound of a trumpet; which it resembles in every thing, excepting that it is longer, and consists of more branches: it is generally called sackbut.

*Speaking* TRUMPET, is a tube from six to fifteen feet long, made of tin, perfectly straight, and with a very large aperture; the mouth-piece being big enough to receive both lips.

The speaking trumpet, or stentorophonic tube, as some call it, is used for magnifying of sound, particularly that of speech, and thus causing it to be heard at a great distance: how it does this, will be easy to understand from the structure thereof, thus illustrated by the ingenious Mr. Martin: let ABC (pl. CCLXXXV. fig. 5. n° 1.) be the tube, BD the axis, and B the mouth-piece for conveying the voice to the tube.

Then it is evident, when a person speaks at B, in the trumpet, the whole force of his voice is spent upon the air contained in the tube, which will be agitated thro' the whole length of the tube; and by various reflections from the side of the tube to the axis, the air along the middle-part of the tube will be greatly condensed, and its momentum proportionably increased; so that, when it comes to agitate the air at the orifice of the tube A C, its force will be as much greater than what it would have been without the tube, as the surface of a sphere, whose radius is equal to the length of the tube, is greater than the surface of the segment of such a sphere, whose base is the orifice of the tube. See the article SOUND.

For a person speaking at B, without the tube, will have the force of his voice spent in exciting concentric superficies of air all around the point B; and, when those superficies or pulses of air are diffused as far as D, every way, it is plain the force of the voice will be diffused through the whole superficies of a sphere whose radius is B D; but in the trumpet it will be so confined, that, at its exit, it will be only diffused thro' so much of that spherical surface of air, as corresponds to the orifice of the tube. But, since the force is given, its intensity will be always inversely, as the number of particles it has to move; and therefore, in the tube, it will be to that without, as the superficies of such a sphere to the area of the large end of the tube, nearly.

To make this matter yet plainer by calculation, let $BD = 5$ feet, then will the diameter of the sphere $DE = 10$ feet, the square of which is 100, which, multiplied by 0,7854, gives 78,54 square feet for the area of a great circle AHEFC. And, therefore, four times that area, *viz.* $4 \times 78,54 = 314,16 =$ square feet in the superficies

ſuperficies of the aerial ſphere. If now the diameter AC, of the end of a trumpet, be one foot, its area will be 0,7854; but 7854 : 314,16 : : 1 : 400, therefore the air at the diſtance of B D, will be agitated by means of the trumpet, with a force 400 times greater than by the bare voice alone. Again, it is farther evident how inſtruments of this form aſſiſt the hearing greatly; for the weak and languid pulſes of the air being received by the large end of the tube, and greatly multiplied and condenſed by the tremulous motion of the parts of the tube, and air agitated by them, are conveyed to the ear by the ſmall end, and ſtrike it with an impetus as much greater than they would have done without it, as the area of the ſmall end at B, is leſs than the area of the large end AC.

From what has been ſaid, it is evident the effect of the tube in magnifying ſound, either for ſpeaking or hearing, depends chiefly upon the length of the tube. But yet ſome advantage may be derived from the particular ſhape thereof. Some very eminent philoſophers have propoſed the figure which is made by the revolution of a parabola about its axis, as the beſt of any, where the mouth-piece of the parabola, and, conſequently, the ſonorous rays, will be reflected parallel to the axis of the tube.

But this parallel reflection ſeems no way eſſential to the magnifying of ſound; on the contrary, it appears rather to hinder ſuch an effect, by preventing the infinite number of reflections and reciprocations of ſound; in which, according to Sir Iſaac Newton, its augmentation doth principally conſiſt. For all reciprocal motion, in every return, is augmented by its generating cauſe, which is here the tremulous motions of the parts of the tube. Therefore, in every repercuſſion from the ſides of the tube, the agitations and pulſes of confined air muſt neceſſarily be increaſed; and conſequently, this augmentation of the impetus of the pulſes muſt be proportional to the number of ſuch repercuſſions; and, therefore, to the length of the tube, and to ſuch a figure as is moſt productive of them. Whence it appears, that the parabolic trumpet is, of all others, the moſt unfit for this purpoſe, inſtead of being the beſt.

But there is one thing more which contributes to the augmenting of theſe agitations of air in the tube, and that is the proportion which the ſeveral portions of air bear to each other, when divided by tranſverſe ſections, at very ſmall, but equal diſtances, from one end of the tube to the other. Thus, let thoſe ſeveral diviſions be made at the points $a$, $b$, $c$, $d$, $e$, *&c.* (*ibid.* n°. 2.) in which let the right lines $a\,k$, $b\,l$, $c\,m$, $d\,n$, *&c.* be taken in geometrical proportion. Then will the portions of air contained between B and $a$, $a$ and $b$, $b$ and $c$, $c$ and $d$, *&c.* be very nearly in the ſame proportion, as being in the ſame ratio with their baſes, when the points of diviſion are indefinitely near together.

But, when any quantity of motion is communicated to a ſeries of elaſtic bodies, it will receive the greateſt augmentation when thoſe bodies are in geometrical proportion. Therefore, ſince the force of the voice is impreſſed upon, and gradually propagated through, a ſeries of elaſtic portions of air in a geometrical ratio to each other, it ſhall receive the greateſt augmentation poſſible.

Now, ſince by conſtruction it is $B\,a = a\,b = b\,c = c\,d$, *&c.* and alſo $a\,k : b\,l : : b\,l : c\,m : : c\,m : d\,n$, and ſo on; therefore, the points $k$, $l$, $m$, $n$, $o$, $p$, $q$, $r$, $s$, A, will, in this caſe, form that curve line, which is called the logarithmetic curve; conſequently, a trumpet, formed by the revolution of this curve about its axis, will augment the ſound in a greater degree than any other figured tube whatever.

*Liſtening*, or *Hearing* TRUMPET, an inſtrument to aſſiſt hearing. See the article HEARING.

TRUMPET-FLOWER, *bignonia*, in botany. See the article BIGNONIA.

TRUMPET-SHELL, the engliſh name of the buccinum of authors. See the article BUCCINUM.

TRUNCATED, in general, is an appellation given to ſuch things as have, or ſeem to have, their points cut off: thus we ſay, a truncated cone, pyramid, leaf, *&c.* See CONE, PYRAMID, *&c.*

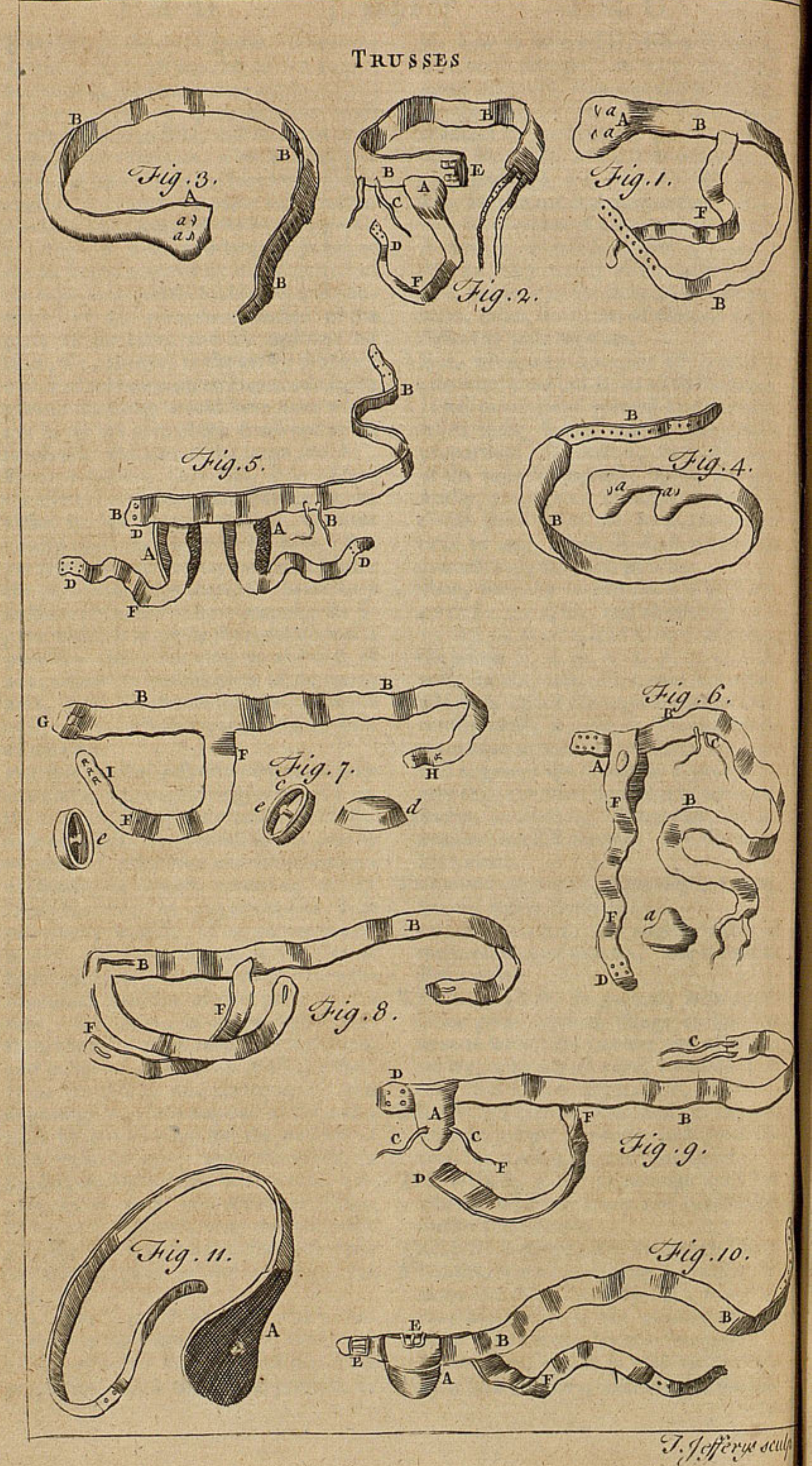
TRUNCHEON, a ſhort ſtaff, or battoon, uſed by kings, generals, and great officers, as a mark of their command.

TRUNDLE, a ſort of carriage with low wheels, whereon heavy and cumberſome burdens are drawn.

TRUNDLE-SHOT. See the article SHOT.

TRUNK, *truncus*, among botaniſts, denotes the ſtem, or body, of a tree; or, that part between the ground and the place where it divides into branches.

In anatomy, trunk is uſed for the buſto of a human body, excluſive of the head and


Trusses
Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.
Fig. 11.
T. Jefferys sculp

and limbs, comprehending the abdomen and thorax. See the article ABDOMEN and THORAX.

Trunk is alfo ufed for the main body of an artery, or vein, in contradiftinction to the branches and ramifications thereof.

Trunk-roots of a plant, are little roots which grow out of the trunks of plants. Thefe are of two kinds: 1. Such as vegetate by a direct defcent, the place of their eruption being fometimes all along the trunk, as in mints, *&c.* and fometimes only in the utmoft point, as in brambles.

2. Such as neither afcend nor defcend, but fhoot forth at right angles to the trunk; which therefore, though as to their office they are true roots, yet, as to their nature, are a medium between a trunk and a root.

TRUNNIONS, or TRUNIONS *of a piece of ordnance*, are thofe knobs or bunches of the gun's metal, which bear her up on the cheeks of the carriage: and hence the trunnion-ring is the ring about a cannon, next before the trunnions.

TRURO, a borough of Cornwal, fituated thirty-two miles north-eaft of the Land's-end.

It fends two members to parliament.

TRUSS, *truffa*, a bundle, or certain quantity of hay, ftraw, *&c.*

A trufs of hay is to contain fifty-fix pounds, or half an hundred weight; thirty-fix truffes make a load. In June and Auguft the trufs is to weigh fixty pounds, on forfeiture of eighteen fhillings per trufs.

A trufs of forage is as much as a trooper can carry on his horfe's crupper.

TRUSS *of flowers*, is ufed, by florifts, to fignify many flowers growing together on the head of a ftalk, as in the cowflip, auricula, *&c.*

TRUSS is alfo ufed for a fort of bandage or ligature, made of fteel, or the like matter, wherewith to keep up the parts, in thofe who have hernias or ruptures. See the article HERNIA.

In plate CCLXXXVI. are reprefented various kinds of truffes, to comprefs the parts, and prevent a relapfe of the inteftine after the rupture has been cured. Some of thefe, as fig. 2, 8, and 9, are made of calicoe, for infants; or of leather, for adults. Others, as fig. 1, 3, 4, and 11, are made of fteel covered with leather. Some are made of fteel-plates, joined by hinges, fo as to be flexible and more eafy, as in fig. 11. Some again are defigned for ruptures on both fides; as fig. 4 and 5. Some are for ruptures on the right fide, as fig. 2 and 3: others for the left; as 1, 9, 10, and 11. Some, again, are faftened to the body by tagged-laces; as fig. 5, 6, and 9: others by ftraps and buckles; as fig. 2, 5, and 9: others by hooks and eyes, or hooks and ftraps; as fig. 1, 3, 4, and 11: and others again by different contrivances; as in fig. 7 and 8.

In all thefe truffes, A denotes the bolfter or comprefs, which is applied to the ring of the abdominal mufcles, after the rupture has been reduced: B B the girdle or belt of the trufs, to be faftened round the body, either with ftrings C C, paffed through the holes D D; or by ftraps and buckles; as in fig. 2 and 10, marked E E: or with hooks, as in fig. 1, 3, 4, and 11, marked *a a*. In many of thefe truffes there is a depending girt, befides that which paffes round the body, which is to be paffed between the legs of women, and faftened to the oppofite part of the belt: as F F in fig. 1, 2, 6, 7, 8, 9, and 10. In fig. 6 is fhewn the bolfter *a*; and in fig. 7 may be feen a wooden bolfter *c d*, *e e* being the button by which it is faftened to the trufs, and *d* the convex part by which it is applied to the rupture.

There a multitude of other truffes, of various forms, contrived by thofe who make it their bufinefs; but we have here given figures of the beft of them, from Heifter's furgery, P. II. p. 71 and 72.

TRUSSES, in a fhip are ropes made faft to the parrels of a yard, either to bind the yard to the maft when the fhip rolls, or to hale down the yards in a ftorm, *&c.*

TRUSSING, in falconry, is a hawk's raifing any fowl, or prey, aloft; firft foaring up, and then defcending with it to the ground.

TRUST, in law, fignifies, in general, that confidence which one perfon repofes in another; and in cafe of non-performance, or breach of this truft, the remedy is by bill in equity, as the common-law ufually takes no notice of trufts.

Conveyances made in the way of truft, which were formerly invented to evade the ftatute of ufes, are not fo much favoured as plain and direct deeds. All declarations of trufts of lands, *&c.* are to be in writing, and figned by the parties. It has been decreed in chancery, that a fine and recovery of a ceftuiqui truft

truft fhall bar and transfer the eftate, as they fhould an eftate at law, where the fame were levied or fuffered on good confideration. And there is a ftatute whereby an infant feifed of an eftate in fee in truft, is enabled to make any conveyance thereof, by order of the court of chancery.

TRUSTEE, one who has an eftate, or money, put or trufted in his hands, for the ufe of another.

Where two or more perfons are appointed truftees, if one of them only receives all or the greateft part of the profits of the lands, *&c.* and is in arrear, and unable to fatisfy the perfon to whom he is feifed in truft, the other, in that cafe, fhall not be anfwerable for more than comes to his hands.

TRUTH, *veritas*, a term ufed in oppofition to falfhood, and applied to propofitions which anfwer, or accord, to the nature and reality of the thing whereof fomething is affirmed or denied.

Truth, according to Mr. Locke, confifts in the joining or feparating of figns, as the things fignified by them do agree or difagree one with another. Now the joining or feparating of figns is what we call making of propofitions. Truth then, properly, relates only to propofitions, whereof there are two forts, mental and verbal; as there are two forts of figns commonly made ufe of, *viz.* ideas and words. See IDEA, WORD, *&c.* Mental propofitions are thofe wherein the ideas in our underftanding are put together, or feparated, by the mind perceiving or judging of their agreement or difagreement.

Verbal propofitions are words put together, or feparated, in affirmative or negative fentences: fo that a propofition confifts in joining or feparating of figns; and truth confifts in putting together, or feparating thofe figns, according as the things they ftand for agree or difagree. See PROPOSITION.

*Moral* TRUTH, confifts in fpeaking things according to the perfuafion of our minds, and is called alfo veracity.

*Metaphyfical*, or *tranfcendental* TRUTH, is nothing but the real exiftance of things conformable to the ideas which we have annexed to their names.

TRUTINATION, the act of weighing or ballancing a thing. See the article BALLANCE.

TRUXILLO, a town of Eftremadura, in Spain, one hundred miles fouth-weft of Toledo: weft long. 6°, north lat. 39° 12′.

TRUXILLO is alfo a town of Terra-Firma, fituated in weft long. 69°, and north lat. 9° 15′.

TRUXILLO is likewife a port-town of Mexico, fituated on the gulph of Honduras: weft long. 88° 30′, north lat. 15° 30′.

TRY, in the fea-language. A fhip is faid to try, or lie a-try, when no fails are abroad but the main-fail or mizzen-fail.

TUB, in commerce, denotes an indeterminate quantity or meafure: thus, a tub of tea contains about fixty pounds; and a tub of camphor from fifty-fix to eighty pounds.

TUBE, *tubus*, in general, pipe, conduit, or canal; a cylinder hollow withinfide, either of lead, iron, wood, glafs, or other matter, for the air, or fome other fluid, to have a free paffage, or conveyance, through. See the article PIPE, *&c.*

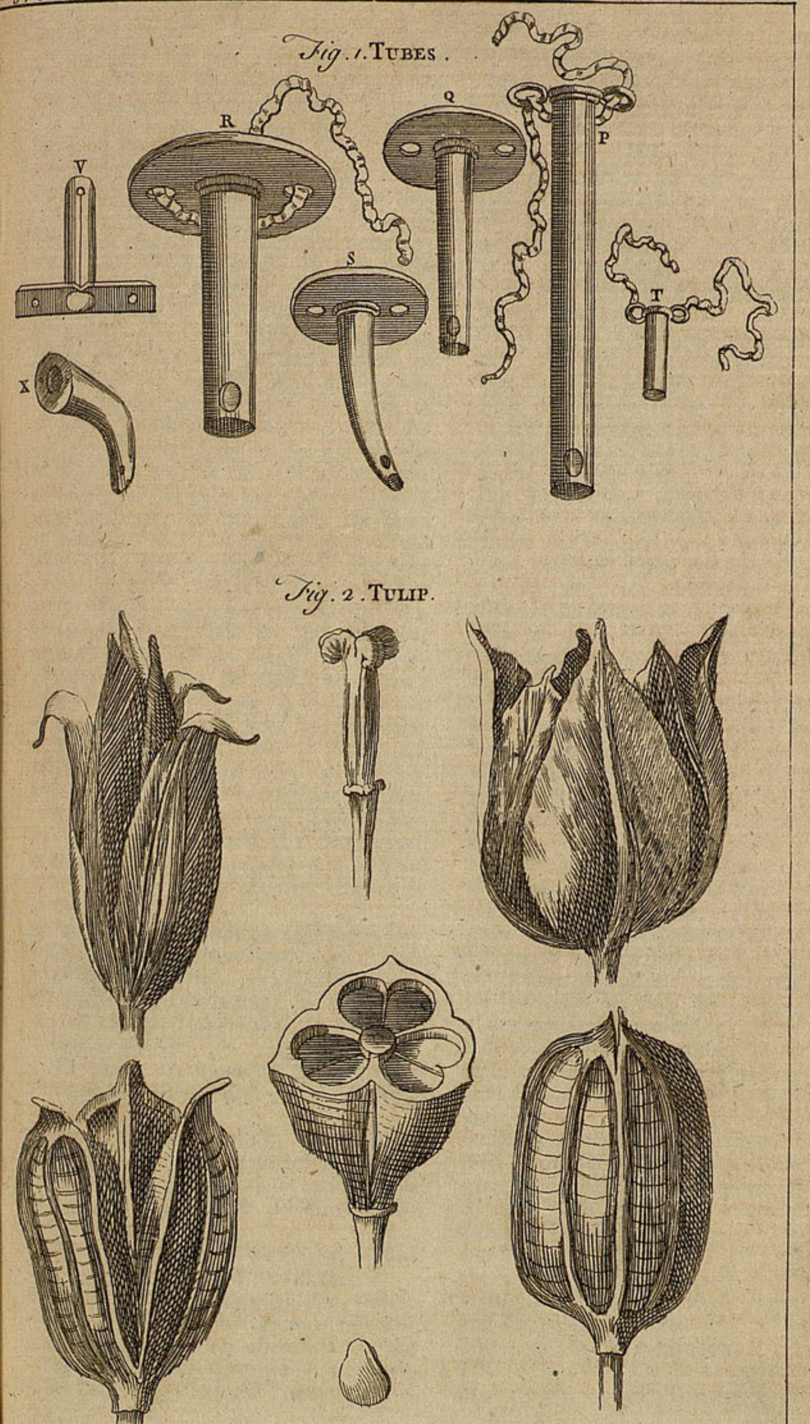
Small filver or leaden tubes are frequently ufed, by furgeons, to draw off blood, matter, or water, from the different parts of the body: they are made of various fizes and fhapes, as reprefented in plate CCLXXXVII. fig. 1. at the letters P, Q, R, S, T, V, X; the ufes of which will be fhewn more at large under the articles WOUND, PARACENTESIS, *&c.*

TUBE, in aftronomy, is fometimes ufed for a telefcope, or more properly, for that part thereof into which the lenfes are fitted, and by which they are directed and ufed. The goodnefs of the tube being of great importance to that of the telefcope, we fhall here add its ftructure.

*The conftruction of a draw* TUBE, *for a telefcope.* The chief points to be regarded here are, that the tube be not troublefome by its weight, nor liable to warp and difturb the pofition of the glaffes; fo that every kind of tube will not ferve in every cafe. See the article TELESCOPE.

1. If the tube be fmall, it is beft made of thin brafs-plates covered with tin, and formed into pipes or draws, to flide within one another.

2. For long tubes, iron would be too heavy, for which reafon fome chufe to make them of paper, thus: A wooden cylinder is turned, of the length of the paper to be ufed, and of a diameter equal to that of the fmalleft draw: about this cylinder is rolled paper till it be of a fufficient thicknefs; when one pipe is dry provide others after the fame manner, ftill making the laft ferve for a mould to the


Fig. 1. TUBES.
R
Q
P
V
S
T
X
Fig. 2. TULIP.
T. Jefferys sculp

the next, till you have enough for the length of the tube defired. Laftly, to the extremes of the draws are to be glewed wooden ferrils, that they may be drawn forth the better.

3. Since paper draws are apt to fwell with moift weather, fo as to fpoil their fliding; and in dry weather to fhrink, which renders them loofe and tottering; in both which cafes the fituation of the lens is eafily difturbed; the beft method of making of tubes is as follows: Glue parchment round a wooden cylinder, and let the parchment be coloured black, to prevent the reflecting rays making any confufion: provide very thin flits of beech, and bending them into a cylinder glue them carefully to the parchment; cover this wooden cafe with white parchment, and, about its outer extreme, make a little ring or ferril: after the fame manner, make another draw over the former, and then another, till you have enough for the length of the tube.

To the inner extremes of each draw fit a wooden ferril, that the fpurious rays, ftriking againft the fides, may be intercepted and loft. In thefe places where the lenfes are to be put, it will be proper to furnifh the ferrils with female fcrews. Provide a wooden cover to defend the object glafs from the duft; and, putting the eye-glafs in its wooden ferril, faften it by the fcrew to the tube. Laftly, provide a little wooden tube of a length equal to the diftance the eye-glafs is to be from the eye, and fit it to the other extreme of the tube.

TUBE-FISH, the TRIGLA with a prickly-head, and with three appendages at each of the pectoral fins. See TRIGLA.

TUBER, or TUBERCLE, in botany, a kind of round turgid root, in form of a knob or turnip.

The plants which produce fuch roots are hence denominated tuberofe, or tuberous, plants.

TUBER, or TUBEROSITY, in medicine, is ufed for a knob, or tumour, growing naturally in any part; in oppofition to tumours, which arife accidentally, or from difeafe.

TUBERA TERRÆ, TRUFFLES, in botany. See the article TRUFFLES.

TUBERCLES, among phyficians, denote little tumours which fuppurate and difcharge pus, and are often found in the lungs, efpecially of confumptive perfons. See CONSUMPTION and PHTHISIS.

TUBEROUS, or TUBEROSE-ROOTS, in botany. See the article TUBER.

TUBINGEN, a city of Swabia, in Germany, fituated on the river Neckar, in the dutchy of Wirtemberg: eaft long. 8° 55′, north lat. 48° 26′.

TUBIPORA, or TUBULARIA, a genus of fubmarine plants, belonging to the cryptogamia clafs, of the hardnefs of coral, and confifting of cylindric tubes rifing from a thin cruft of the fame fort of matter with themfelves.

TUBULARIA FOSSILIS, in natural hiftory, the name of a fpecies of coral found very often foffil in Germany and Italy, and compofed of a great number of tubes, or longitudinal pipes, often refembling fo many worms ranged perpendicularly in the mafs. They are ufually found either in maffes of a lax-ftone, or in fingle tubules in thofe of the harder and firmer texture. In thefe two ftates, this foffil makes two very different appearances; and, according to the different directions in the mafs, or the different views of them that the fections of it place them in, they make a number of very elegant figures.

TUBULI FOSSILIS, in natural hiftory, the tubules, or cafes of fea-worms, found buried in the earth. They are met with of various fizes, fometimes complete, and buried in the ftrata of earth or ftone; fometimes they are more or lefs perfect, and are immerfed in maffes of the ludus helmontii or feptariæ, and in this ftate they make one kind of lapis fyringoides, or pipe-ftone; but the moft beautiful fyringoides, or pipe-ftones, are the parts of the bottoms of fhips, or pofts fixed in the fea, which have been pierced, in their original ftate of wood, by thefe fea-worms, and afterwards petrified with the cafes or tubuli of the worms remaining in them; thefe are ufually of a pale-yellow or whitifh-wax colour, and the body of the mafs of a brownifh or blackifh hue, but retaining the ftructure of the wood: of thefe there are beautiful fpecimens in great abundance on the fhore of the ifland Sheppy. We have the very fame fubftances alfo buried in our clay-pits, about London and at Richmond; but in thefe the wood is highly faturated with the matter of the common vitriolic pyrites, and the pipes often filled with the fame fubftance. See SYRINGOIDES.

TUBULI LACTIFERI, in anatomy, the fmall tubes, or veffels, through which

the milk flows to the nipples of women's breasts. See the article MILK.

TUBULUS MARINUS, or CANALIS, in natural history, a genus of univalve shells, of an oblong figure, terminating in a point, and hollow within, so as to resemble a tube or horn; and hence have, by some old writers, been called dentalia. See DENTALIA.

Of these shells some are striated, some straight, some bent like a horn, and some in form of a crescent.

TUCANA, the TOUCAN, in ornithology. See the article TOUCAN.

TUCK *of a ship*, the trussing or gathering up the quarter under water; which if she lie deep, makes her have a broad, or, as they call it, fat quarter, and hinders her steering, by keeping the water from passing swiftly to her rudder; and if this trussing lie too high above the water, she will want bearing for her works behind, unless her quarter be very well laid out.

TUCUMAN, the south-west division of the province of La Plata, or Paraguay, in South America.

TUCUYO, a town of Terra-Firma: west long. 68° 30′, north lat. 7°.

TUDELA, a town of Navarre, in Spain, situated on the river Ebro, fifty-five miles south of PAMPELUNA.

TULIP, *tulipa*, in botany, a genus of the hexandria-monogynia class of plants, with a campanulated flower, consisting of six oblong, hollow, and erect petals: the fruit is a triquetrous, and trilocular capsule, containing a great many flat seeds ranged in a double order. See plate CCLXXXVII. fig. 2.

The characters of a good tulip are, that the stem should be strong and tall; the flower should consist of six petals, three within and three without; and the former should be larger than the latter: the bottom of the flower should be proportioned to the top, and the ends of the leaves should be rounded, not pointed; the leaves, when opened, should neither turn inward nor bend outward, but stand erect; and the whole flower should be of a middling size, neither too large nor too small: the stripes must be small and regular, and should all arise from the bottom of the flower: the chives also should not be yellow but of a brown colour.

TULIP-TREE, *liriodendrum*, in botany. See the article LIRIODENDRUM.

TULLE, a town of France, in the province of Guienne: east long. 1° 31′, north lat. 45° 23′.

TULN, a town of Germany, fifteen miles west of Vienna.

TUMEFACTION, the act of swelling or rising into a tumour. See the next article.

TUMOUR, or TUMOR, in medicine and surgery, a preternatural rising or eminence on any part of the body. Tumour is also defined, by physicians, a solution of continuity arising from some humour collected in a certain part of the body, which disjoins the continuous parts, insinuates itself between them, and destroys their proper form.

Whether there be any such preternatural rising or enlargement on any part of the body, may be discovered from inspection, but more particularly by feeling. And, notwithstanding, it is a general custom to refer excrescences, as warts, corns, and such as grow in the nose and pudenda, to the class of tumours; yet, because they grow not from beneath, but out of, or upon, the skin itself, it is thought proper not to comprehend them in the general division of tumours. See EXCRESCENCE, CORN, WART, *&c.*

There are tumours of various kinds, distinguished by particular names, according to the different causes from whence they proceed, and the particular parts wherein they are seated; some are called hot, others cold and watry; some are termed windy, others scirrhous; and some are named benign, others malignant: but Heister finds fault with these distinctions. There are some tumours which being contained in a proper membrane, are therefore called cystic; and if this should be in an artery, it is usually termed aneurism; but when in a vein, a varix. When in the veins of the anus, or rectum, the disorder is termed hæmorrhoids; but if the tumour be in the scrotum, unguen, or at the umbilicus, it is generally called a hernia: if any pus, or matter, is contained in the tumour, it is called an abscess; and if the tumour is seated in a bone, it is termed exostosis. See the articles CYST, ANEURISM, VARIX, HÆMORRHOIDS, HERNIA, ABSCESS, and EXOSTOSIS.

The forementioned class of tumours are all of them subdivided into several other kinds: thus the hot and burning tumours, which are the same with inflammations, are generally termed phlegmons when violent and seated in the common inte-

integuments; but when flighter, they are commonly called furuncles. The inflammation which is not fixed deep, but fpreads only fuperficially upon the fkin, is termed an eryfipelas: the inflammatory tumour that arifes at the finger-ends is termed paronychia: that which fixes in the groin or armpits is called a bubo; and that under the ears a parotis. When an inflammation feizes the hands and feet from extreme cold, chilblains arife; which tumour is called pernio. See the articles INFLAMMATION, FURUNCLE, ERYSIPELAS, PARONYCHIA, BUBO, PAROTIDES, and PERNIONES.

TUMOURS *of the breafts.* See the article INFLAMMATIONS *of the breafts.*

*Cancerous* TUMOURS. See CANCER.

*Encyfted* TUMOURS, tumours arifing in different parts of the body, but contained in certain membranous coats: thefe are fometimes harder, fometimes fofter, of a palifh colour, and ufually attended with little pain. Thefe tumours arife from obftructions either in the glands, or in the adipofe membrane, more efpecially about the face and neck, where they occafion great deformity. The membranous coat with which thefe tumours are invefted, is often of a confiderable thicknefs, and is ufually the coat of the difordered gland, or fome of the adipofe cells. At their beginning they are ufually very fmall and moveable; but encreafing by flow degrees, they grow fometimes to an enormous bulk. See the article CYST.

The confiftence of fome of thefe tumours is foft and fluctuating, and of others more hard and firm. They are of all fhapes and fizes, and fome of them become hard as a callus, and unmoveable, while others are, for the generality, foft and moveable. See CALLUS.

They are diftinguifhed according to the confiftence of their contents; fome are called atheromata, from their contents refembling pafte; others, which have them of the confiftence of honey, are called meliceres; but if they are of a fatty fubftance, like fuet or lard, they are called fteatomata. If they happen in a gland which becomes indurated, they are called fchirrous: and laftly, when they are of a flefhy confiftence, they are called farcomata. Some of thefe tumours have been found alfo full of hair. See ATHEROMA, &c.

They are diftinguifhed by others according to the places where they are fituated. Thofe feated under the fcalp are called talpa, teftudo, or lupia. Thofe in the neck, ftrumæ or fcrophulæ; and thofe in the hands and feet, efpecially if among the tendons, are called ganglions. See the article GANGLIO, &c.

There is no general method for the cure of them; but the furgeon, according to their different circumftances, attempts this by difcuffion, fuppuration, or extirpation. See the articles DISPERSION and SUPPURATION.

But if the tumour can neither be difperfed nor fuppurated, but continues to enlarge itfelf, it is advifeable to extirpate it in order to prevent its turning into a cancerous nature. There are feveral methods in practice for extirpating thefe tumours according to their nature and fize: thofe which are fmall and hard, or hung by a root as by a ftalk, are generally beft removed by ligature, in the manner of warts; by which means they wither and fall off of themfelves in a few days. But the moft ready and expeditious method is to cut them off with a fcalpel, and then heal up the wound: but if in removing them this way you divide a confiderable artery, you may ftop it by fome potential, or even the actual, cautery; or elfe, by taking it up with a needle and thread. Laftly, thefe tumours may be often removed by the application of cauftic or corroding medicines, retained about the root by means of plafters, compreffes, and a bandage; and when you find the root of the tumour almoft corroded through, the reft may be divided by the fcalpel. See the article CAUSTIC.

If the root of the encyfted tumour appears too large for it to be conveniently taken off by ligature, you muft then remove it either by the knife or by the cauftics, though the latter is ufually preferred. In order to extirpate it by the knife, you muft firft make a longitudinal incifion upon the tumour; and if that does not appear fufficient, make another incifion acrofs the former, till you think the wound large enough for taking out the tumour; in order to which you next dilate the integuments, and feparate them from the cyft of the tumour, which you are to take out whole, if poffible, either by means of the fcalpel, a hook, or by paffing a crooked needle, with a ftrong thread, crofswife under the tumour; but great caution is neceffary in this operation, left any important part that is contiguous to the tumour be injured.

6 The

The tumour being thus carefully extracted, if the wound and hæmorrhage be fmall you may prefs the lips together; and by covering the fame with lint and compreffes, retained with a proper bandage, the patient is cured in a few days time; but in cafe of a profufe hæmorrhage the blood is to be ftopped either by ligature, aftringents, or the actual or potential cautery.

*Fungous* TUMOURS. See FUNGUS.

*Inflammatory* TUMOURS. See the article INFLAMMATION.

*Oedematous* TUMOURS. See OEDEMA.

TUMOURS *of the parotid glands.* See the article PAROTIDES.

*Peftilential* TUMOURS. See the articles BUBO and CARUNCLE.

*Scirrhous* TUMOURS. See SCIRRHOUS.

TUMOURS *of the tefticles.* See TESTICLES.

TUN, or TON, originally fignifies a large veffel or cafk of an oblong form, biggeft in the middle, and diminifhing towards its two ends, girt about with hoops, and ufed for ftowing feveral kinds of merchandize, for convenience of carriage; as brandy, oil, fugar, fkins, hats, *&c.* This word is alfo ufed for certain veffels of extraordinary bignefs, ferving to keep wine in for feveral years.

TUN is alfo a certain meafure for liquids; as wine, oil, *&c.* See MEASURE.

TUN is alfo a certain weight whereby the burden of fhips, *&c.* are eftimated. See the article WEIGHT.

TUNA, in botany, the fame with the cactus. See the article CACTUS.

TUNBRIDGE, a town of Kent, fituated thirty-three miles weft of Canterbury, much reforted to on account of its excellent waters.

TUNE, or TONE, in mufic, that property of founds whereby they come under the relation of acute and grave to one another. See the articles ACUTENESS, GRAVITY, TONE, and SOUND.

Though gravity and acutenefs are mere terms of relation, the tune of the found is fomething abfolute, every found having its own proper tone, which muft be under fome determinate meafure in the nature of the thing.

The only difference then, between one tune and another is in the degrees.

If two or more founds be compared together in this relation, they are either equal or unequal in the degree of tune. Such as are equal are called unifons.

The unequal conftitute what we call an interval, which is the difference of time between two founds.

Sonorous bodies we find differ in tune: 1. According to the different kinds of matter; thus a wedge of filver founds much more acute than a wedge of gold of the fame fhape and dimenfions, in which cafe the tones are proportional to the fpecific gravity. 2. According to the different quantities of the fame matter in bodies of the fame figure, a folid fphere of brafs, one foot diameter, founds acuter than one of two feet diameter; in which cafe the tunes are proportional to the quantity of matter. Here then are different tunes connected with different fpecific gravities and quantities of matter, as their immediate caufe. In effect, the meafures of tune are only fought in the relations of the motions that are the caufe of found, which are no way fo difcernable as in vibrations of chords. See the article CHORD.

In the general we find that, in two chords, all things being equal, except tenfion, or thicknefs, or length, the tunes are different; there muft, therefore, be a difference in the vibrations owing to thefe different tenfions, *&c.* which difference can only be in the velocity of the courfes and recourfes of the chords, through the fpaces wherein they move to and again. Now, upon examining the proportion of the velocity and the things juft mentioned, wherein it depends, it is found, to a demonftration, that all the vibrations of the fame chord are performed in equal times. Hence, as the tone of a found depends on the nature of thofe vibrations, whofe difference we can conceive no otherwife than as having different velocities; and as the fmall vibrations of the fame chord are performed in equal times, and it is found true, in fact, that the found of any body, arifing from any individual ftroke, tho' it grow gradually weaker, yet continues the fame tone from firft to laft: it follows, that the tone is neceffarily connected with a certain quantity of time, in making every fingle vibration; or, that a certain number of vibrations, accomplifhed in a given time, conftitutes a certain determinate tune; for the more frequent thofe vibrations are, the more acute the tone; and, the flower and fewer they are, the more grave the found, though performed in the fame fpace of time; fo that any given note of a tune is made by one

one certain meafure of velocity of vibrations, *i. e.* fuch certain courfes and recourfes of a chord or ftring, in fuch a certain fpace of time, conftitute a determinate tune. See the article NOTE.

This theory is ftrongly fupported by our beft and lateft writers on mufic, Dr. Holder, Mr. Malcolm, *&c.* both from reafon and experience. Dr. Wallis, who holds it very reafonable, adds that it is evident the degrees of acutenefs are reciprocally as the lengths of the chords, though, he fays, he will not pofitively affirm that the degrees of acutenefs anfwer the number of vibrations as their true caufe: but this difference arifes hence, that he doubts whether the thing has been fufficiently proved by experiment. Indeed, whether the different number of vibrations, in a given time, is the true caufe on the part of the object of our perceiving a difference of tune, is a thing which, we conceive, does not come within the reach of experiment. It is enough that the hypothefis is reafonable. See the articles CONCORD, HARMONY, *&c.*

TUNICA, a kind of waiftcoat, or under-garment, in ufe amongft the Romans. They wore it within doors by itfelf, and abroad under the gown. The common people could not afford the toga, and fo went in their tunics, whence Horace calls them popellus tunicatus. The feveral forts of the tunic were the palmata, the anguftíclavia, and the laticlavia. The firft was worn by generals in a triumph, and perhaps always under the toga picta; it had its name either from the great breadth of the clavi, equal to the palm of the hand; or elfe from the figures of palms, embroidered on it. For the other two, fee the article CLAVUS.

It was by thefe three different forts of tunics, that the three different orders of the roman people were diftinguifhed in habit.

TUNICA, *tunic*, in anatomy, is applied to the membranes which inveft the veffels, and divers others of the lefs folid parts of the body; thus the inteftines are formed of five tunics, or coats, for which fee the article INTESTINES.

There are alfo five tunics, or coats, of the eye, for which fee the article EYE.

TUNIS, the capital of the kingdom of Tunis, thirty miles fouth of Carthage-ruins, 300 miles eaft of Algiers, and 120 fouth-weft of Trapano, in Sicily; a populous city, about three miles in circumference; eaft long. 10° north lat. 36° 20'. The kingdom of Tunis is fituated on the coaft of Barbary, in Africa, being bounded by the Mediterranean Sea, on the north. It extends 200 miles in length from eaft to weft, along the fhore of the Mediterranean; the breadth is very unequal.

TUNNAGE is ufed for a cuftom or impoft, payable to the crown, for goods and merchandize imported or exported, and is to be paid after a certain rate for every tun thereof. This duty, as well as that of poundage, was firft granted for life to king Charles II. and has been continued in the fame manner to his royal fucceffors, down to his prefent majefty king George III.

TUNNEL-NET, a net for taking partridges, which fhould not exceed fifteen feet in length, nor be lefs than eighteen inches in breadth, or opening for the entrance. See the article NET.

When you have found a covey, fetch a compafs and pitch the net at a good diftance from them, fometimes farther, at other times nearer, according to the fituation of the ground; furround them either with a natural or artificial ftalking horfe, and gently drive them towards the net, not coming on them in a direct line, but by turnings and windings, and fometimes ftanding ftill, as if the horfe grazed. In cafe they make a ftand and look up, it is a fign of fear, and that they intend to take wing; ftand ftill therefore, or retreat for a while, and when you find them quiet after a little refpite, and bufy in feeking after meat, you are to move nearer, and if any fingle partridge lies remote from the reft, he may be brought in by fetching a compafs about him. The wing of the tunnel muft not be pitched in a direct line, but inclining to a femi-circle. See STALKING.

TUNNING *of ale or beer*, a part of the procefs of brewing, or rather an operation which is the fequel thereof. When the beer has worked or fermented in an open vat, as long as is proper, tun it up into feafoned veffels, that is, fuch as have had ale or beer in them before; for if it be put into new cafks, it muft be made ftronger than ordinary, elfe it will not keep fo long, becaufe the cafk will imbibe the fpirits, and the reft will foon become flat and vapid. It is beft to tun beer juft when it comes to a due fermentation, and gets a good head; for then it has the moft ftrength to clear itfelf in the cafk, and what works over may be put into the

the small beer, and must be supplied with fresh beer of the same brewing. When the beer is tunned, carry it while it works in the cask, into a good cellar, or proper place to preserve it; for if it be stirred after it has done working, it will be apt to grow stale, sour, and become alegar, unless it be drawn out into another cask.

TUNNY, *thynnus*, in ichthyology, the scomber, with eight or nine pinnules on the hinder part of the back, and a furrow at the belly fins. See SCOMBER.

TURBAN, or TURBANT, the head-dress of most of the eastern nations. It consists of two parts, a cap, and a sash of fine linnen, or taffety, artfully wound in divers plaits about the cap. The Turks call the sash turbent, whence we have formed turban. The cap has no brim, is pretty flat, though roundish at top, and quilted with cotton, but does not cover the ears. There is a good deal of art in giving the turban a fine air, and the making of them is a particular trade. The sash of the Turks turban is white linnen; that of the Persians red woollen. These are the distinguishing marks of their different religions. Sophi, king of Persia, being of the sect of Ali, was the first who assumed the last colour, to distinguish himself from the Turks, who are of the sect of Omar, and whom the Persians esteem heretics. The Emirs, who pretend to be descended of the race of Mahomet, wear their turbans quite green, which was the colour wore by that false prophet. The grand seignior's turban is as big as a bushel, and so exceedingly respected by the Turks, that they scarce dare touch it. It is adorned with three plumes of feathers, enriched with diamonds and precious stones, and he has an officer on purpose to look after it. The grand vizier's turban has two plumes; so have those of divers other officers, only smaller one than another; others have only one, and others none at all. The turban of the officers of the divan is of a peculiar form.

TURBAN-SHELL, in conchyliology, the english name of the roundish centronia. See the article CENTRONIA.

TURBARY, denotes a right to dig turfs on another's ground; and it is likewise taken for the ground or place where turfs are digged, sometimes called the turfary.

TURBINATED, is a term applied by naturalists, to shells, which are spiral, or wreathed, conically, from a larger basis to a kind of apex.

TURBITH, or TURPETH-ROOT, in the materia medica, the cortical part of the root of an indian convolvulus, brought to us in oblong pieces, of a brown or ash-colour on the outside, and whitish within: the best is ponderous, not wrinkled, easy to break, and discovering a large quantity of resinous matter to the eye: its taste is at first sweetish; when chewed for a little time, it becomes acid, pungent, and nauseous. This root is a cathartic, not of the safest, or most certain kind: the resinous matter in which its virtues resides, appears to be very unequally distributed, insomuch that some pieces, taken from a scruple to a dram, purge violently; whilst others, in larger doses, have scarce any effect at all. An extract made from the root, is more uniform in strength, though not superior, or equal, to purgatives more common in the shops.

Turbith pays a duty on each pound imported of $11\frac{62\frac{1}{2}}{100}$d. and draws back, for each pound exported, $10\frac{20}{100}$d.

TURBITH MINERAL, a name given by chemists, to a yellow precipitate of mercury, prepared after the following manner. Upon purified quicksilver, contained in a glass vessel, pour double its weight of the strong spirit or oil of vitriol. Heat the liquor by degrees, so as at length to make it boil, till a white mass remains, which is to be thoroughly dried, with a strong fire. This mass, on the effusion of warm water, grows yellowish, and falls into powder; which is to be carefully ground with the water in a glass mortar: then suffer it to settle, pour off the water, and wash the powder in several parcels of fresh water, until it is sufficiently dulcified.

This preparation is a strong emetic, and operates the most powerfully of all the mercurials that can be safely given internally. Its action, however, is not confined to the primæ viæ; it will sometimes excite a ptyalism, if a purgative is not soon taken after it. It is used chiefly in violent gonorrhæas, and other venereal cases, where there is a great flux of humours to the parts; the dose is from two grains, to six or eight, though there are some constitutions, which have been used to mercurials, that bear well even the dose of a scruple. This medicine has also of late been recommended,

as the most effectual preservative against the hydrophobia. See HYDROPHOBIA. The washings of turbith mineral are by some externally applied for the itch, and other cutaneous foulnesses; but in these cases, though it often does service, the patient must not be too free with it.

TURBO, in natural history, a genus of univalve shells, with a long, wide, and depressed mouth, in some species approaching to a round shape, and in some having teeth, in others not. They all grow narrow toward the base, and are auriculated, and terminate in a very long and sharp point.

Of this genus, there are a great many elegant species; as the slender turbo, with ventricose spires, and a small round mouth, about five or six inches long. (see plate CCLXXXIX. fig. 3. nº 1.) The rough screw-shell is represented, (*ibid.* nº 2.) besides which, there are numerous other species, as the caterpillar-shell, telescope-shell, &c. all distinguished by their different spires, and the form of their mouths.

TURBOT, or TURBUT, in ichthyology, the english name of a species of pleuronectes, with the eyes on the right side, and the body smooth. See the article PLEURONECTES.

It grows to a considerable size, and is one of the most esteemed fish at table.

TURCICA TERRA, TURKY-EARTH, in the materia medica, a very fine bole or medicinal earth, dug in great plenty in the neighbourhood of Adrianople, and used by the Turks as a sudorific and astringent; and famous among them in pestilential diseases. It is sometimes brought over to us also made up into flattish, orbicular masses of two or three drams-weight, and sealed with some turkish characters. This earth is of a somewhat lax and friable texture, yet considerably heavy, of a greyish, red colour, but always redder on the surface than within; extremely soft, and naturally of a smooth surface: it melts freely in the mouth, with a considerably strong, astringent taste. See the article BOLES.

TURCOISE, or TURQUOISE, *turchesia*, in natural history, an ore of copper, erroneously ranked among gems. See the article COPPER.

There are, indeed, two kinds of turcois; the one a true and genuine ore of copper; the other the bones of animals tinged to a beautiful blue colour, by having been buried in places where copper-ore has been near them.

That kind which we usually distinguish by the name of the turquoise of the old rock, and which Pliny and the antients called callais, is a true and genuine copper-ore, and is of exactly that kind in regard to this metal, that the hæmatites is to iron; it is found in the perpendicular fissures of the strata of stone, which contain copper adhering to their sides in form of a crust, and rising into botryoide efflorescences, which sometimes stand single, and are in bigness from the size of a pea to that of a walnut; but sometimes happening to be placed close to one another, they join and form flat crusts or masses, extending, in the manner of crusts of the hæmatites, to three, four, or more inches in breadth; in these the prominent part of every tubercle appearing on the surface, the whole seems a conjunction of semi-circular bodies of a fine blue colour joined by an intermediate substance of the same nature.

This kind of the turquoise is of a very close texture and glossy surface, but very soft, and, when broken, shews the same crustated and striated texture with the hæmatites; only that the striæ are usually finer, and the plates better joined. It ferments with aqua fortis, and may be in great part dissolved by it; and on calcining, it loses all its colour, and becomes of a dirty white. This is produced in Persia, and some other parts of the east. The Germans also have a botryoide copper-ore, in some of their mines; but it is green and much softer than the true turquoise of this kind, though this has been often produced among us also under the name of that gem.

The other turquoise is nothing more than the teeth or bones of animals, which have lain in the way of effluvia, in which copper has been contained, and by this means have acquired veins and streaks of a deep blue, which, on the whole being slightly calcined, diffuse themselves through all the substance, and give it the fine pale blue we so much admire in this gem. If the fire that diffuses this colour be a little too strong, it sends it wholly off, and leaves in place of the turquoise only a white bone. The turquoises of this last kind are common in France; there are mines of them there, and the people who work them are perfectly acquainted

quainted with the method of diffufing the colour through them. Thefe are what are now ufually worn, and, when fine, are called, by many of our jewellers, turquoifes of the old rock, as well as the other. The virtues attributed to this gem are very great, but all we know of it at prefent is, that, like the other bodies that contain copper, it is a violent emetic, and not fit to be received into practice.

TURCOMANIA, a province of afiatic Turky, bounded by Perfia on the eaft, and anfwers to the antient Armenia; its capital is Erzerum. See ERZERUM.

TURDUS, in ornithology, a genus of birds, of the order of the pafferes, the beak of which is of a conic form, and ftraight, only fomewhat bent on the upper part, and has no membrane at the bafe: the tongue is lacerated and emarginated.

Under this genus are comprehended the black-bird, thrufh, red-wing, &c. See the article BLACK-BIRD, &c.

TURDUS, in ichthyology, the name by which authors call the green labrus, with a blue line on each fide; a very beautiful fifh, from eight to fourteen inches in length, and confiderably thick in proportion. See the article LABRUS.

TURENNE, a town of Guienne, in France: eaft long. 1° 20′, and north lat. 45° 7′.

TURF, a blackifh fulphureous earth, ufed in feveral parts of the kingdom as fuel. See FUEL and TURBARY.

TURGESCENCE, or TURGESCENCY, among phyficians, denotes a fwelling, or growing bloated.

TURIN, the capital of Piedmont, in Italy, and of the king of Sardinia's dominions, is fituated at the confluence of the rivers Po and Doria, 100 miles fouth-weft of Milan: eaft long. 7° 16′, and north lat. 44° 50′.

TURIONES, among herbalifts, denotes the firft young tender fhoots, which plants annually put forth.

TURKEY, *meleagris*, in ornithology, a genus of birds, the anterior part of the head of which is covered with a flefhy pendulous fubftance, the fides of the head alfo, and the throat, are covered with a papillous flefhy matter, and there is a longitudinal flefhy creft, of a reddifh, bluifh, or purplifh colour, and a foft fubftance. This is a large, but unweildy bird; the head is ftrangely covered and ornamented with a pendulous, foft, flefhy, fubftance, as already obferved; the eyes are fmall, but bright and piercing, the wings are moderately long, though not at all formed for fupporting fo large a bulk in long flights, they have each twenty-eight long feathers; the tail is long and large, the legs moderately long and very robuft.

There is but one known fpecies of this genus.

TURKY, a very extenfive empire, comprehending fome of the richeft countries in Europe, Afia, and Africa.

Turky in Europe, comprehends Romania, Bulgaria, Servia, Bofnia, Ragufa, Wallachia, Moldavia, Beffarabia, Budziac, Crim, and Little Tartary, with Albania, Epirus, Macedonia, Theffaly, and all the antient Greece, with its numerous iflands. See ROMANIA, &c.

Turky in Afia, comprehends Natolia, Diarbeck, Syria, Turcomania, and part of Georgia and Arabia. See the article NATOLIA, &c.

And Turky in Africa, comprehends the fruitful and extenfive country of Egypt. See the article EGYPT.

TURKY-EARTH. See TURCICA TERRA.

TURMERIC, in the materia medica, the root of a plant, called by botanifts curcuma. See the article CURCUMA.

It is a fmall root, of an oblong figure, ufually met with in pieces from half an inch to an inch or two in length, and at the utmoft furface the thicknefs of a man's little finger; its furface is uneven, and rifes into knobs in many places, and the longer pieces are feldom very ftraight; it is very heavy and hard to break; it is not eafily cut through with a knife, but, when cut, leaves a gloffy furface. Its colour externally, is a pale whitifh grey, with fome faint tinge of yellownefs, and when broken, is of a fine yellow within; this colour is bright and pale, and without admixture, when the root is frefh; but in keeping it by degrees becomes reddifh, and at length is much like faffron in the cake. Thrown into water, it fpeedily gives it a fine yellow tinge, and, chewed in the mouth, it gives the fpittle the fame colour. It is eafily powdered in the mortar, and, according to its different age, makes a yellow, an orange colour, or a reddifh powder. It has a kind of aromatic fmell, with fomething of the odour of ginger in it. The tafte is acrid and difagreeable, and has a confiderable bitternefs.

It is brought from the Eaft-Indies, where they ufe it in fauces and foods. As a medi-

medicine, it is esteemed aperient and emmenagogue, and of singular efficacy in the jaundice.

But besides these uses, the glovers use it for dying their leather, and the turners to give an agreeable yellow to several of their works made in the whiter woods.

TURN, in law, a court held twice a year, *viz.* within a month after Easter and Michaelmas, respectively, by the sheriff of every county.

By magna charta, sheriffs were restrained from holding pleas of the crown; but they are still judges of record, and may take indictments and presentments, and inquire of all treasons and felonies by the common law, as well as the lowest offences against the king; common nusances, annoyances, purprestures, *&c.* Also of persons selling corrupt victuals, breaking the assise of ale and beer, or keeping false weights, *&c.* disturbers of the peace and barretors, *&c.* and may amerce for offences, *&c.*

TURNADO, or TORNADO, a wind which on some coasts blows all night from the shore.

TURNAMENT, or TOURNAMENT, a martial sport, or exercise, which the antient cavaliers used to perform to shew their bravery and address.

TURNEP, *rapa*, in botany, a species of Brassica. See the article BRASSICA.

TURNERA, in botany, a genus of the pentandria-trigynia class of plants, the flower of which consists of five petals obversely cordated, and sharp-pointed: the fruit is an oval, unilocular capsule, containing a great many oblong and obtuse seeds.

TURNHOUT, a town of Brabant, twenty-four miles north-east of Antwerp.

TURNING, a branch of sculpture, being the art of fashioning hard bodies, as brass, ivory, wood, *&c.* into a round or oval form, in a lathe.

Turning is performed by putting the substance to be turned upon two points as an axis, and moving it round on that axis; while an edge-tool, set steady to the outside of the substance in a circumvolution thereof, cuts off all the parts which lie farther off the axis, and makes the outside of that substance concentric to the axis. See the article LATHE.

The invention of turning seems to have been very antient. Some, indeed, to do honour to the age, will have it brought to perfection by the moderns; but, if what Pliny and some other antient authors relate, be true, that the antients turned those precious vases enriched with figures and ornaments in relievo, which we still see in the cabinets of the curious, it must be owned that all that has been added in these ages, makes but a poor amends for what we lost of the manner of turning of the antients.

TURNING-EVIL, in cattle, a disease that causes them frequently to turn round in the same place. It is also called the sturdy. The common remedy, recommended by Mr. Markham, is to throw the beast down, and bind him; then to open his skull, and take out a little bladder, filled with water and blood, which usually lies near the membrace of the brain, and then gradually heal the wound.

TURNPIKE, a gate set up a-cross a road, watched by an officer for the purpose, in order to stop travellers, waggons, coaches, *&c.* to take toll of them towards repairing or keeping the roads in repair.

Justices of the peace, and other commissioners, are authorized to appoint surveyors of the roads, and collectors of toll, which is usually 1 s. or 6 d. for a coach or waggon, and 1 d. for a horse, *&c.* In case any persons shall drive horses or other cattle through grounds adjoining to the highways, thereby to avoid the toll, they are liable to forfeit 10 s. Likewise if any one assaults a collector of the tolls, or by force passes through a turnpike-gate without paying, he forfeits 5 l. leviable by justices of peace; and maliciously pulling down a turnpike is deemed felony, *&c.* It is also enacted; that 20 s. shall be paid for every hundred that a carriage with its loading weighs above 6000 pound weight, and that engines may be set up at turnpikes for weighing such carriages.

TURNPIKE, is also used in the military art for a beam struck full of spikes, to be placed in a gap, a breach, or at the entrance of a camp, to keep off an enemy. See the article CHEVAUX *de frise.*

TURNSOLE, or TORNSOLE, in botany, the english name for the croton of Linnæus, and the heliotropium-tricoccum of other authors. See CROTON.

TURPENTINE, a transparent sort of resin, flowing either naturally or by incision from several unctuous and resinous trees, as the terebinthus, larch, pine, fir, *&c.* We distinguish several kinds of turpentines; as that of Chio, that of Venice, that

that of Bourdeaux, that of Cyprus, Strasburg, &c.

The turpentine of Chio or Scio, which is the only genuine kind, and that which gives the denomination to all the rest, is a whitish resin, bordering a little on green, very clear, and a little odoriferous; drawn by incision from a tree called terebinthus, very common in that island, as also in Cyprus, and some parts of France and Spain.

The resin must be chosen of a solid consistence almost without either taste or smell, and not at all tenacious, which distinguishes it from the false turpentine of Venice, commonly substituted for it, which has a brisker smell, a bitter taste, and sticks much to the finger. This turpentine of Chio is indisputably the best, but its scarcity occasions it to be little in use. The turpentine of Venice is falsely so called; for, though there was a turpentine antiently brought from Venice, yet, that now so called comes from Dauphine. It is liquid, of the consistence of a thick syrup, and whitish; and flows either spontaneously or by incision, from the larix or larch-tree chiefly in the wood de Pilatze.

That flowing naturally, called by the peasants bijon, is a kind of balsam, not inferior in virtue to that of Peru, for which it is frequently substituted. That drawn by incision, after the tree has ceased to yield spontaneously, is of considerable use in several arts, and it is even of this that varnish is chiefly made. It must be chosen white and transparent, and care be taken that it be not counterfeited with oil of turpentine. The turpentine of Bourdeaux is white, and as thick as honey. It does not ooze from the tree in the manner it is sent to us, but is properly a composition wherein among other ingredients is a white hard sort of resin called galipot. See PITCH.

The turpentine of Strasburg, the produce of the abies or silver fir, is that most commonly used among us, and is preferred by our people to that of Venice, which is distinguished from it by its green hue, fragrant smell, and citron-flavour.

The uses of turpentine in medicine are innumerable. It is a great vulnerary, and very detergent, and as such is prescribed in abscesses, ulcerations, &c. It promotes expectoration, and as such is prescribed in diseases of the lungs and breast; but it is most famous for clearing the urinary passages, and as such prescribed in obstructions of the reins, in gonorrhœas, &c.

*Oil of* TURPENTINE. There are two kinds of oil drawn from turpentine, by distillation; the first white, the second red, both esteemed as balsams proper for the cure of wounds, chilblains, &c. But they are so little used among us, that it is not easy to procure either of them.

What is commonly sold under the name of oil of turpentine, or etherial oil, is only a distillation of the resinous juice of the tree, fresh as it is gathered. It is used with success in the cure of green wounds, as also by the painters, farriers, &c. To be good, it must be clear and pellucid as water, of a strong penetrating smell, and very inflammable.

TURPENTINE-TREE, *terebinthus*, in botany, a species of pistacia. See the article PISTACIA.

TURQUOISE, or TURCOISE. See the article TURCOISE.

TURRITIS, TOWER-MUSTARD, in botany, a genus of the tetradynamia-siliquosa class of plants, with a tetrapetalous cruciform flower: its fruit is an extremely long pod, containing numerous seeds.

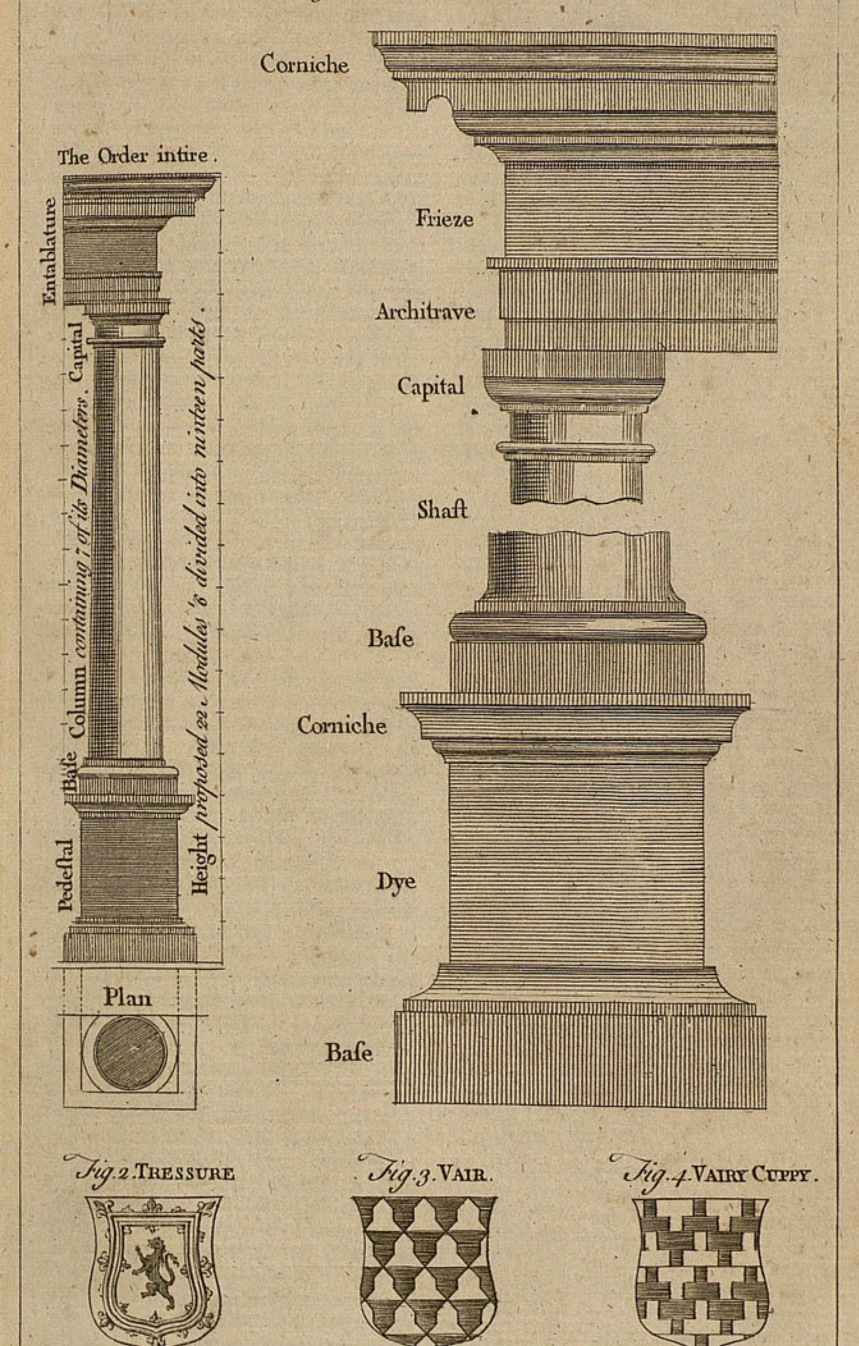
TURSIS, a town of the kingdom of Naples, in Italy, situated ten miles north-west of the gulph of Taranto: east long. 17° 6′, north lat. 40° 15′.

TURUNDA, in medicine and surgery, denotes a tent, pellet, or pencil; or a piece of lint thrust into a wound, ulcer, &c. See the article TENT.

TURTLE, in ichthyology, a name given to some species of the testudo, as the hawk's bill turtle is the testudo with acuminated ungues, four on the hinder as well as the fore feet; the green turtle, or the testudo, with two ungues on the fore feet, and one on the hinder; and the long headed turtle, or the great oval headed testudo. See the article TESTUDO.

TURTLE DOVE, is a species of the columba kept tame. See COLUMBA.

TUSCAN ORDER, in architecture, the first, simplest, and most massive of the five orders. See pl. CCLXXXVIII. fig. 1. The tuscan is called the rustic order by Vitruvius, and M. de Cambray agrees with him, who in his parallel, says, it never ought to be used but in country-houses and palaces. M. Le Clerc adds, that in the manner Vitruvius, Palladio, and some others, have ordered it, it does not deserve to be used at all. But in Vignola's manner of composition, he al-




T. Jefferys sculp

lows it a beauty, even in its fimplicity, and fuch as makes it proper, not only for private houfes, but even for public buildings, as in the piazzas of fquares and markets, in the magazines and granaries of cities, and even in the offices and lower apartments of palaces.

The tufcan has its character and proportions as well as the other orders; but we have no antient monuments to give us any regular tufcan pillar for a ftandard. M. Perrault obferves, that the characters of the tufcan are nearly the fame with thofe of the doric, and adds, that the tufcan is in effect no more than the doric made fomewhat ftronger, by fhortening the fhaft of the column; and fimpler, by the fmall number, and largenefs of the mouldings. See DORIC.

Vitruvius makes the whole height of the order fourteen modules, in which he is followed by Vignola, M. Le Clerc, *&c.* Serlio makes it but twelve. Palladio gives us but one Tufcan profile much the fame as that of Vitruvius, and another too rich, on which fide Scamozzi is likewife too faulty. Hence it is, that that of Vignola, who has made the order very regular, is moft followed by the modern architects.

Of all the orders, the tufcan is the moft eafily executed, as having neither triglyphs nor dentils, nor modillions, to cramp its intercolumns. On this account, the columns of this order may be ranged in any of the five manners of Vitruvius, *viz.* the pycnoftyle, fyftyle, euftyle, diaftyle, and aræoftyle. See the articles PYCNOSTYLE, SYSTYLE, *&c.*

TUSCAN *order by proportions of equal parts.* The height of the pedeftal, being two diameters, is divided into 4, giving 1 to the bafe, whofe plinth is $\frac{2}{3}$ thereof, the other part is divided into three, giving one to the fillet, and two to the hollow. The breadth of the die or naked is one diameter, and $\frac{1}{4}$, and the projection of the bafe is equal to its height, the fillet hath three-fourths thereof. The height of the corniche is half the bafe, being $\frac{1}{8}$ of the whole height, and is divided into 8, giving 2 to the hollow, 1 to the fillet, and 5 to the band; the projection is equal to the bafe, and the fillet hath three of thefe parts. Bafe of the column: the height is one half a diameter, and is divided into fix parts, giving three to the plinth, 2 and $\frac{1}{2}$ to the torus, and $\frac{1}{2}$ a part to the fillet; the whole projection is $\frac{1}{3}$ of its height. The hollow, or cincture, is one fourth of a circle, in all the orders, and belongs to the fhaft of the column.

The diminifhing of this column is $\frac{1}{4}$ of the diameter, and is divided into 9, giving 2 $\frac{1}{2}$ to the frieze of the capital, $\frac{1}{2}$ a part to the fillet, 3 to the ovolo, and 3 to the abacus. The whole projection is $\frac{1}{8}$ of the diameter, being perpendicular to the body of the column below, and the fillet projects equal to its height. The collerino, or necking of all the orders in general, is one of thofe nine parts in the capital, and the fillet half a part, the projection is 1 and $\frac{1}{4}$ of thefe parts, and the fillet equal to its height. The height of the entablature being one diameter and $\frac{3}{4}$, is divided into 6, giving 2 to the architrave, 1 $\frac{1}{2}$ to the frieze, and 2 $\frac{1}{2}$ to the corniche.

For the members of the architrave, divide the height into feven parts, giving 2 $\frac{1}{2}$ to the firft face, 3 $\frac{1}{2}$ to the fecond, and 1 to the band at top. The projection is equal to the band, and the fecond face a third thereof. The firft face of all the architraves is perpendicular to the naked of the column at the top. For the corniche, divide the height into 9, giving 1 $\frac{1}{2}$ to the hollow, $\frac{1}{2}$ to the fillet, 1 $\frac{1}{2}$ to the ovolo, 2 to the corona, $\frac{1}{2}$ a part to the fillet, 2 to the fcima recta, and 1 to the fillet. For the projections, the hollow hath 2 of thefe parts, the ovolo 3 $\frac{1}{2}$, the corona 6, the fillet 6 $\frac{1}{2}$, and the whole 9 being equal to the height. See the figure.

TUSCAN EARTH, in the materia medica, a yellowifh, white, pure bole, confiderably heavy, of a very fmooth furface, not eafily breaking between the fingers, but adhering flightly to the tongue, and melting very readily in the mouth. It is dug in many parts of Italy, particularly about Florence, where there is a ftratum of it eight or ten feet thick, at the depth of five or fix from the furface. It is given as a fudorific, and efteemed a great medicine in fevers, attended with diarrhœas. See the article BOLES.

TUSCANY, a dutchy of Italy, encompaffed by the pope's territories on the north-eaft and fouth, and bounded by the Tufcan Sea on the fouth-weft, and by the territories of Lucca and Modena on the north-weft, being 100 miles long, and almoft as many broad.

TUSCULAN, in matters of literature, a term which frequently occurs in the phrafe *tufculan queftions.* Cicero's tufculan queftions are difputations on feveral topics in moral philofophy, which that great

great author took occasion to denominate from Tusculanum, the name of a country-seat or villa, where they were composed, and where he lays the scene of the dispute. They are comprised in five books, the first on the contempt of death; the second of enduring pain; the third on asswaging grief; the fourth on the other perturbations of the mind; and the last, to shew that virtue is sufficient to a happy life.

TUSSILAGO, in botany, a genus of the syngenesia-polygamia superflua class of plants, the compound flower of which is various. In some there are only tubulose hermaphrodite corollulæ: there are no female ones. In others, there are tubulose hermaphrodite ones on the disk; the female ones are ligulated on the verge. In others, there are tubulose hermaphrodite flowers on the disk; the female ones being naked, and mixed with the petal, which is infundibuliform: the limb is quinquifid or quadrifid, acute, bent backwards, and longer than the cup. There is no pericarpium except the cup: the seed following the hermaphrodite flower is single, oblong, compressed, and by a small thread sustains a hairy pap. If there are any seeds following the female flower, they are like the hermaphrodite ones.

This genus comprehends the tussilago, or common colt's-foot, the cacalia, and the petasites, or butter-bur.

The common tussilago, or colt's-foot, stands recommended in coughs, and other disorders of the breast and lungs; practice, however, seems to have almost rejected it. The petasites, or butter-bur, has been given in the dose of a dram, or more, as an aromatic, and likewise as an aperient and deobstruent; these virtues, however, it possesses in so small a degree, as to have lost its reputation in the shops.

TUSSIS, the cough. See COUGH.

TUT, in armory, &c. an imperial ensign of a golden globe, with a cross on it.

TUTBURY, a market-town of Staffordshire, situated eighteen miles east of Stafford.

TUTELARY, *tutelaris*, one who has taken something into his patronage and protection.

TUTOR, in the civil law, is one chosen to look to the person and estate of children left by their fathers and mothers in their minority. A person nominated tutor either by testament, or by the relations of the minor, is to decline that office if he have five children alive, if he have any other considerable tutorage, if he be under twenty-five years of age, if he be a priest, or a regent in an university, or if he have any law suit with the minors, &c. The marriage of a pupil, without the consent of his tutor, is invalid. Tutors may do any thing for their pupils, but nothing against them, and the same laws which put them under a necessity of preserving the interest of the minors, put them under an incapacity of hurting them. See the article TUTORAGE.

TUTOR, is also used in our universities for a member of some college or hall, who takes on him the instruction of some young students in the arts or faculties.

TUTORAGE, *tutela*, in the civil law, a term equivalent to guardianship in the common law, signifying an office imposed on any one to take care of the effects of one or more minors. See GUARDIANSHIP and TUTOR.

By the roman law, there are three kinds of tutorage; testamentary, which is appointed by the father's testament; legal, which is given by the law to the nearest relation; and dative, which is appointed by the magistrate. But in all customary provinces, as France, &c. all tutorages are dative and elective, and though the father have by testament nominated the next relation to his pupil, yet is not that nomination of any force, unless the choice be confirmed by that of the magistrate, &c. By the roman law, tutorage expires at fourteen years of age. See the article CURATOR.

TUTTY, *tutia*, a recrement of mixed metals, in which lapis calaminaris, or zink in its metallic form, is an ingredient, collected in the furnaces where brass is made from copper and calamine, and where the mixed metals are run. In these furnaces they place, under the roof and about the upper parts of the sides, rods of iron, and sometimes rolls of dry earth, about which the tutty is afterwards found. Therefore the tutty which we use in the shops at this time, owes its origin truly and properly to zink, which sublimes with a very small fire into a kind of flowers, and when fused with any other metal, flies from it in abundance under this form, and also frequently takes some part of that metal, more or less, up with it. Hence it is evident, that the tutty or cadmia of the antients, must have been wholly different from ours, as they used no zink nor any of its ores in the furnace where they collected

lected it. See ZINK and CADMIA.

Our tutty then is a hard and heavy semi-metallic recrement, sometimes met with in the shops in thin flat pieces or flakes, but most abundantly in tubular cylindric pieces, resembling segments of the barks of trees pushed off from the branches without breaking; these are of different lengths and diameters. The finest tutty is that of a fine deep brown on the outside, and of a yellowish tinge within; the thickest, brightest, and most granulated; the hardest to break, and that which has least foulness among it.

Tutty is celebrated as an ophthalmic, and frequently employed as such in unguents and collyria. See COLLYRIA.

It is to be prepared for use by heating it several times red hot, and quenching it suddenly in rose or common water; then powdering it in a mortar, and finally levigating it with a little water upon a smooth hard marble, till there does not remain the least gritty particle among it. It is then to be dropped upon a chalk-stone, and left to dry.

TUXFORD, a market-town of Nottinghamshire, twenty miles north-east of Nottingham.

TUY, a town of Spain, in the province of Galicia, situated on the river Minho, on the confines of Portugal, twelve miles east of Vigo.

TWA-NIGHTS GESTE, among our ancestors, was a guest that stayed at an inn a second night, for whom the host was not answerable for any injury done by him, as he was in case of a third night-awn hynde.

TWEED, a river of Scotland, which rises on the confines of the shire of Clydesdale, and running eastward through Tweedale, and dividing the shire of Mers from Tiviotdale and Northumberland, falls into the German sea at Berwick.

TWEEDALE, a county of Scotland, bounded by Lothian on the north, by Mers and Tiviotdale on the east, by Annandale on the south, and Clydesdale on the west.

TWEER, a city of Russia, capital of the province of Tweer, situated on the river Wolga, ninety miles north of Moscow, in east long. 30° 37′, north lat. 57° 25′.

TWELF-HINDI, among the english Saxons, was where every person was valued at a certain price; and if any injury was done either to a person or his goods, a pecuniary mulct was imposed, and paid in satisfaction of that injury, according to the worth and quality of that person to whom it was done, in which case such as were worth 1200 shillings, were called twelf-hindi; and if an injury was done to such persons, satisfaction was to be made accordingly.

TWELFTH-DAY, or TWELFTH-TIDE, the festival of the epiphany, or the manifestation of Christ to the Gentiles; so called, as being the twelfth day, exclusive, from the nativity or Christmas-day.

TWELVE MEN, otherwise called jury or inquest, is a number of twelve persons, or upwards, as far as twenty-four, by whose oath, as to matters of fact, all trials pass, both in civil and criminal cases, through all courts of the common law in this realm. See JURY and TRIAL.

TWI-HINDI, among our Saxon Ancestors, were persons valued at 200 s. these men were of the lowest degree, and if such were killed, the mulct was 30 s. See the article TWELFTH-HINDI.

TWILIGHT, *crepusculum*, that light, whether in the morning before sun-rise, or in the evening after sun-set, supposed to begin and end when the least stars that can be seen by the naked eye cease, or begin, to appear, represented in plate CCLXXXIX. fig. 1. by that obscure part comprehended between HOAB, which is neither dark nor light. This is the twilight, the line AB being 18° below the horizon HO; and during the time the sun passeth from HO to AB, in the parallel of any day, his rays are partly refracted by the atmosphere, and so we have some faint light till he gets below the limit AB, when we are left in total darkness. Or it is twilight, while the sun is passing from X to R, from Y to S, and from Z to M, on the days the sun describes the parallels TR, ÆQ and VW. By means of the atmosphere it happens, that though none of the sun's direct rays can come to us after it is set, yet we still enjoy its reflected light for some time, and night approaches by degrees. For after the sun is hid from our eyes, the upper part of our atmosphere remains for some time exposed to its rays, and from thence the whole is illuminated by reflection. But as the sun grows lower and lower, that portion of the atmosphere which is above our horizon, becomes enlightened till the sun has got eighteen degrees below it; after which it ceases to be illuminated thereby, till it has got within as many degrees of the eastern side of the horizon; at which

time it begins to illuminate the atmosphere again, and in appearance to diffuse its light throughout the heavens, which continues to increase till the sun be up. See AIR, ATMOSPHERE, REFLECTION, and REFRACTION.

Hence it is, that during that part of the year in which the sun is never eighteen degrees below our horizon, there is a continued twilight from sun-setting to sun-rising. Now that part of the year in the latitude of London, is while the sun is passing from about the fifth degree of gemini to the twelfth of cancer; that is, from about the 26th of May to the 18th of July: for when the sun describes the parallel T R, that is, the tropic of cancer, there is no dark night at all; for the parallel of that day, T R, doth not touch A B, nor will it for about a month before and after. On the other hand, the shortest twilight in the year happens about the 14th of October and 4th of March, for then the sun describes the parallel whose distance *e o* is the least between H O and A B of any other whatsoever.

As the twilight depends on the quantity of matter in the atmosphere fit to reflect the sun's rays, and also on the height of it (for the higher the atmosphere is, the longer will it be, before the upper parts of it will cease to be illuminated) the duration of it will be various. For instance, in winter, when the air is condensed with cold, and the atmosphere upon that account lower, the twilight will be shorter; and in summer, when the limits of the atmosphere are extended by the rarefaction and dilatation of the air, of which it consists, the duration of the twilight will be greater. And for the like reason, the morning twilight, the air being at that time condensed and contracted by the cold of the preceding night, will be shorter than the evening one, when the air is more dilated and expanded.

TWINS, two young ones delivered at a birth, by an animal which ordinarily brings forth but one.

TWINS, in astronomy, the same with gemini. See the article GEMINI.

TWIST *of a rope, cord,* &c. See the article ROPE, *&c.*

TWIST is also used for the inside or flat part of a man's thigh, upon which a true horseman rests when on horseback.

*To* TWIST *an horse,* is violently to wring or twist his testicles twice about, which causes them to dry up, and deprives them of nourishment, and reduces the horse to the same state of impotency with a gelding.

TWISTED COLUMN. See COLUMN.

TYCHONIC SYSTEM, or HYPOTHESIS, an order or arrangement of the heavenly bodies, of an intermediate nature between the copernican and ptolemaic, or participating alike of them both. See the articles COPERNICAN and PTOLEMAIC.

This system had its name and original from Tycho Brahe, a nobleman of Denmark, who lived in the latter part of the last century. This philosopher, though he approved of the copernican system, yet could not reconcile himself to the motion of the earth; and being on the other hand convinced the ptolemaic scheme could not be true, he contrived one different from either, as represented plate CCLXXXIX. fig. 2. In this the earth has no motion allowed it, but the annual and diurnal phænomena are solved by the motion of the sun about the earth, as in the ptolemaic scheme; and those of mercury and venus are solved by this contrivance, though not in the same manner, nor so simply and naturally as in the copernican system. The tychonic system then supposed the earth in the center of the world, that is, of the firmament of stars, and also of the orbits of the sun and moon; but at the same time it made the sun the center of the planetary motions, *viz.* of the orbits of mercury, venus, mars, jupiter and saturn. Thus the sun, with all its planets, was made to revolve about the earth once a year, to solve the phænomena arising from the annual motion, and every twenty-four hours, to account for those of the diurnal motion. But this hypothesis is so monstrously absurd, and contrary to the great simplicity of nature, and, in some respects, even contradictory to appearances, that it obtained but little credit, and soon gave way to the copernican system.

After this scheme had been proposed for some time, it received a correction by allowing the earth a motion about its axis to account for the diurnal phænomena of the heavens; and so this came to be called the semi-tychonic system. But this was still void of the truth, and encumbered with such hypothesis, as the true mathematician and the genuine philosopher could never relish.

TYGER, or TIGER, in zoology. See the article TIGER.

TYLE, or TILE, in building, a sort of thin

thin, fictitious, laminated brick, used on the roofs of houses; or more properly a kind of fat clayey earth, kneaded and moulded, of a just thickness, dried and burnt in a kiln like a brick, and used in the covering and paving of houses. See the article BRICK.

Tyles are made, says Mr. Leybourn, of better earth than brick-earth, and something nearer akin to the potter's earth. According to 17 Edward IV. the earth for tyles should be cast up before the first of November, stirred and turned before the first of February, and not made into tyles before the first of March; and should likewise be tried and severed from stones, marle, and chalk. For the method of burning them, see the article BRICK.

As to the method of applying tyles, some lay them dry as they come from the kiln, without mortar or any thing else; others lay them in a kind of mortar made of loam and horse dung. In some parts, as in Kent, they lay them in moss. See the article MORTAR, *&c.*

There are various kinds of tyles, for the various occasions of building; as plain, thack, ridge, roof, crease, gutter, pan, crooked, flemish, corner, hip, dormar, scallop, astragal, traverse, paving, and dutch tyles.

Plain or thack tyles, are those in ordinary use for covering of houses. They are squeezed flat, while yet soft, in a mould. They are of an oblong figure, and by 17 Ed. IV. c. 4. are to be 10 ½ inches long, and 6 ¼ broad, and half an inch and half a quarter thick. But these dimensions are not over strictly kept to. Ridge, roof or crease tyles, are those used to cover the ridges of houses, being made circular breadth-wise, like an half cylinder; they are, by the aforesaid statute, to be 13 inches long, and of the same thickness with the plain tyles. Hip or corner tyles, are those which lie on the hips or corners of roofs. As to form, they are first made flat like plain tyles, but of a quadrangular figure, whose two sides are right lines and two end arches of circles, one end being a little concave and the other convex. The convex end is to be about seven times as broad as the concave end, so that they would be triangular but that one corner is taken off; then, before they are burnt, they are bent on a mould breadth-wise, like ridge tyles. They have an hole at their narrow end to nail them on by, and are laid with their narrow end upwards; by statute they are to be 10 ½ inches long, and of a convenient breadth and thickness. Gutter-tyles, are those which lie in gutters or valleys in cross buildings. They are made like corner tyles, only the corners of the broad end are turned back again with two wings. They have no holes in them, but are laid with the broad end upwards, without any nailing. They are made in the same mould as the corner tyles, and have the same dimensions on the convex side. Their wings are each four inches broad, and eight long. Pan, crooked, or flemish tyles, are used in covering of sheds, lean to's, and all kinds of flat roof buildings. They are in form of an oblong parallelogram, as plain tyles, but are bent breadth wise forwards and backwards in form of an S, only one of the arches is at least three times as big as the other; which biggest arch is always laid uppermost, and the less arch of another tyle lies over the edge of the great arch of the former. They have no holes for pins, but hang on the laths by a knot of their own earth. They are usually 14 ½ inches long, and 10 ½ broad. By 12 Geo. I. c. 25. they are to be, when burnt, not less than 13½ inches long, and 9 ½ inches wide, and half an inch thick. Dormar or dorman tyles consist of a plain tyle and a triangular piece of a plain one standing up at right angles to one side of the plain tyle, and swept with an arch of a circle from the other end, which end terminates in a point. Of these tyles there are two kinds, the triangular piece in some standing on the right, in others on the left side of the plain tyle. And of these again there are two kinds, some having a plain whole tyle, others but half a plain tyle. But in them all the plain tyle has two holes for the pins at that end where the broad end of the triangular piece stands. Their use is to be laid in the gutters betwixt the roof and the cheeks or sides of the dormars, the plain part lying on the roof, and the triangular part standing perpendicularly by the cheek of the dormar; they are excellent to keep out the wet in those places, and yet they are hardly known any where but in Sussex. The dimensions of the plain tyle part, are the same as those of a plain tyle, and the triangular part is of the same length, and its breadth at one end seven inches, and at the other nothing. Scallop or astragal tyles are in all respects like plain tyles, only their lower ends are in form of an astragal, *viz.* a semi-

ſemi-circle with a ſquare on each ſide. They are uſed in ſome places for weather tyling. Tranſverſe tyles, are a kind of irregular plain tyles, having the pin-holes broken out, or one of the lower corners broken off. Theſe are laid with the broken end upwards, upon rafters where pinned tyles cannot hang.

Flemiſh or dutch tyles are of two kinds, antient and modern; the antient were uſed for chimney foot-paces; they were painted with antique figures, and frequently with poſtures of ſoldiers, ſome with compartments, and ſometimes with moreſque devices; but they come much ſhort of the deſign and colours of the modern ones. The modern flemiſh tyles are commonly uſed plaſtered up in the jaumbs of chimneys inſtead of chimney-corner ſtones. Theſe are better glazed, and ſuch as are painted (for ſome are only white) are done with more curious figures and more lively colours than the antient ones. But both kinds ſeem to be made of the ſame whitiſh clay as our white glazed earthen ware; the modern ones are commonly painted with birds, flowers, *&c.* The antient ones are only five inches and a quarter ſquare, and about three quarters of an inch thick; the modern ones ſix inches and a half ſquare, and three quarters of an inch thick.

TYLE, in aſſaying, a ſmall flat piece of dried earth uſed to cover the veſſels in which metals are in fuſion. Cramer directs, that theſe be made of a mixture of clay and ſand, or powder of flints, or broken crucibles, formed into a paſte, and ſpread thin with a rolling-pin on a table, or flat ſtone. From theſe cakes or plates, pieces are to be cut with a knife, to the ſhape and ſize of the mouths of the veſſels to be cloſed. It is beſt then to pare away the borders of the under ſurface of the piece thus cut off, that this ſurface may immediately touch all the way the edge of the mouth of the veſſel, leaving a prominent rim, by which means the tile fits cloſe upon the veſſel, and is not ſo eaſily diſplaced by accidents, as a touch of the poker, or of the coals put on to mend the fire, as it otherwiſe would be. Finally, put on the middle of the outer ſurface a ſmall bit of the ſame matter, which ſerves as a kind of handle, by means of which it may be conveniently managed by the tongs, and eaſily taken off and put on again at pleaſure.

TYLER, one that covers or paves with tyles. Tylers and bricklayers were incorporated 10 Eliz. under the name of maſter and wardens of the ſociety of freemen of the myſtery and art of tylers and bricklayers.

TYLWITH, in matters of heraldry and deſcent, is ſometimes uſed for a tribe or family branching out of another, which the modern heralds more uſually call the ſecond or third houſe.

TYMPAN, or TYMPANUM, in architecture, the area of a pediment, being that part which is in a level with the naked of the frieze. Or it is the ſpace included between the three corniches of a triangular pediment, or the two corniches of a circular one.

Sometimes the tympan is cut out, and the part filled with an iron lattice to give light, and ſometimes it is enriched with ſculpture in baſſo-relievo.

TYMPAN, among joiners, is alſo applied to the panels of the doors. See PANEL.

TYMPAN *of an arch*, is a triangular ſpace or table in the corners or ſides of an arch, uſually hollowed, and enriched ſometimes with branches of laurel, olive-tree, or oak, or with trophies, *&c.* ſomtimes with flying figures, as fame, *&c.* or ſitting figures, as the cardinal virtues.

TYMPAN, among printers, a double frame belonging to the preſs, covered with parchment, on which the blank ſheets are laid in order to be printed off. See the article PRINTING-PRESS.

TYMPANUM, or TYMPAN, in mechanics, a kind of wheel placed round an axis or cylindrical beam, on the top of which are two levers or fixed ſtaves, for the more eaſy turning the axis, in order to raiſe a weight required. The tympanum is much the ſame with the peritrochium, but that the cylinder of the axis of the peritrochium is much ſhorter, and leſs than the cylinder of the tympapanum. See AXIS *in peritrochio.*

TYMPANUM *of a machine*, is alſo uſed for an hollow wheel, wherein one or more people, or other animals, walk to turn it; ſuch as that of ſome cranes, calenders, *&c.* See the article CRANE, *&c.*

TYMPANUM, in anatomy, the middle part of the ear. See the article EAR.

TYMPANUM, a drum. See DRUM.

TYMPANY, *tympanites*, in medicine, a flatulent tumour or ſwelling of the abdomen or belly, very hard, equable and permanent, whereby the ſkin is ſtretched ſo tight, that when ſtruck it gives a ſound like that of a drum. Hoffman obſerves, that

that this disease has been generally accounted, both by the antients and moderns, a species of dropsy, but very improperly; for though it is often productive of, or complicated with an ascites, yet it is in itself a perfectly distinct disease, and accompanied with no extravasation of water in the abdomen; persons who have died of it having been found, on opening the body, with the abdomen as dry as in a state of health; but the stomach has been found, in some, greatly distended with flatulencies, and containing a viscid humour, though in no great quantity. The intestines are also usually found distended, and, as it were, pellucid, and, on being pricked, they collapse, without the appearance of any water. And, in some cases, on opening the abdomen, the whole swelling has subsided, on the exclusion of a gross flatulence which had distended it. The intestines have, in some subjects, been found distended to the bigness of a man's thigh, in some parts, and in others, lower down, so contorted and twisted together, that there could be no passage either for the wind or the excrements. It is not uncommon also, on dissection, to find great numbers of worms, of the common long kind, in the intestines. See the article DROPSY.

A tympany, without a dropsy, is most incident to women after labour, when the lochia have been suppressed by colds or otherwise, or discharged in too small quantities; a bad regimen during the lying in, and the omitting to swathe the belly properly down, has also often a bad effect this way. In cases of this kind, women find soon afterwards the abdomen inflated, with a considerable uneasiness, a difficulty of breathing, costiveness, and an unaccountable anxiety. These are the breeding symptoms of the approaching tympany; and the same often happens after unskilful treatment in abortions, and after the leaving a part of the lochia behind, or the injuring the uterus in delivery. See DELIVERY.

Children are also subject to tympanies, when violently afflicted with worms, and sometimes after the measles and small-pox; and if due care is not taken of these cases, at their beginning, the superior parts soon become extenuated, and the patients die. Extreme voracity of children also, and their eating great quantities of food, at a time when the stomach is weak, sometimes brings on this disorder.

The tympany is justly accounted one of the more dangerous kinds of diseases, since the persons afflicted with it much oftener die than recover. When it is accompanied with a dropsy, it is scarce ever cured; and a simple tympany in women and children, if neglected at first, degenerates into a chronic disorder, and hardly admits of a cure. Some, indeed, have gone so far as to say, they never knew a patient, afflicted with a tympany, recover; but this seems too rash a judgment. That distention of the abdomen, which is properly called a flatulent colic, is by some accounted a species of tympany; but this is not naturally dangerous, and is easily cured, except when it is attended with spasms of the viscera; in which case the medicines given to restore the due tone of the intestines, are by no means proper in regard to the spasms.

In curing flatulences of the stomach and intestines, the physician's principal intention is to promote a discharge of the vapours by the anus, and to attenuate and gently carry off, by stool, the rough and viscid matter which contributes to the generation of the flatulences. For this purpose, first derivative, discutient, and evacuating clysters are to be used, such as those prepared of hyssop, clary, flowers of common and roman chamomile, tops of yarrow, juniper-berries, and the larger carminative seeds, with veal broth, adding a sufficient quantity of sal gemmæ, sal ammoniac, or Epsom salt, and the oil of chamomile. But it is to be observed, that one or two clysters are not sufficient for removing the disorder, but they are to be frequently repeated. With these are to be interposed laxatives, possessed of a carminative, and, at the same time, somewhat of an anodyne quality. Or, if the patient is strong, and the inflation a real tympanites, two parts of the extractum panchymagogum crollii, with one part of the pilulæ wildeganfi, or of the pilulæ starckii, or pilulæ de styrace, in some very spirituous carminative water, is to be exhibited. See the article FLATULENCY.

After these are to be used medicines possessed of a moderate balsamic principle, and a volatile, oleous, and aromatic salt, commonly called carminatives; but the operation of these medicines is not to be so explained, as if by their subtile volatile salt they attenuate the matter of the flatulences and rendered it thinner; but rather, because, by invigorating the tone

and ſyſtole of the inteſtinal coats, they hinder the ſtagnation of the flatulences, move them from their ſeat, and render them more capable of being eaſily eliminated, or prevent the generation of new flatulences; for, as the deſtroyed periſtaltic motion of the ſtomach and inteſtines is the principal cauſe of flatulences, ſo all medicines which have a remarkable virtue in ſtrengthening theſe parts, are moſt proper for the removal of this diſorder. The beſt and moſt approved of this kind, are powders prepared of the roots of wake-robin, zedoary, and white burnet; the digeſtive ſalt of ſylvius, or vitriolated tartar; cumin ſeeds, the tops of the leſſer centaury, and dried orange-peel, each a drachm, and ſix drops of the genuine oil of chamomile; or of the oil of cedar, or of the oil of orange-peel; to which, if there is a ſuſpicion of an acid lodged in the primæ viæ, we may commodiouſly add crabs eyes.

To this claſs of medicines may be referred the following liquid form: take of the carminative water of Dorncrellius, of the waters of common chamomile and zedoary prepared with wine, each one ounce; of the ſpiritus nitri dulcis, of the pure oil of caraway, eight drops mixed with two drachms of ſugar.

Nor are external remedies, ſuch as liniments applied by way of ointment to the whole epigaſtric region, to be neglected. The principal ingredients of theſe liniments ought to be boiled with oils of chamomile and rue, oil of nutmeg and peruvian balſam, with which may be mixed the oils of juniper, caraway, aniſe, or cumins. But preferable to all others, the liquid balſam of life may be uſed, which when mixed with three parts of Hungary water, and applied by way of ointment to the abdomen, or laid on with a warm linen-cloth, is found of great efficacy.

TYPE, *typus*, a copy, image, or reſemblance of ſome model. This word is much uſed among divines, to ſignify a ſymbol, ſign, or figure of ſomething to come; in which ſenſe it is commonly uſed with relation to antitype, which is the thing itſelf, whereof the other is a type or figure. See the article ANTITYPE.

TYPE *of Conſtans*, a formulary or model of faith, publiſhed by the emperor Conſtans, who being a favourer of the monothelites, and exaſperated at the little ſucceſs which the ecthеſis of his uncle Heraclius had met with, publiſhed a new formulary in the manner of an edict in 648, forbidding all perſons to make uſe of the expreſſions "one" or "two wills in Jeſus Chriſt." Martin I. condemned the type in the luteran council, *anno* 649, and the ſynod made a canon expreſsly againſt this heretical model; at which the emperor was ſo enraged, that he forced the pope into baniſhment. See the article ECTHESIS.

TYPE, among letter-founders and printers, the ſame with letter. See the articles LETTER and LETTER-FOUNDERY.

TYPE is alſo uſed to denote the order obſerved in the intenſion and remiſſion of fevers, pulſes, *&c.*

TYPHA, in botany, a genus of the monoecia-triandria claſs of plants, having no corolla: the male flowers are arranged into a cylindric amentum; the female flowers form alſo a cylindric amentum below the male ones; there is no pericarpium, the fruit growing together in great numbers, conſtitutes a cylinder, in each of which there is a ſingle ovated ſeed, furniſhed with a ſtyle, and ſtanding upon a ſeta, which ſeta ſtands on a capillary pappus.

TYPHODES, τυφώδης, or τῦφος, in medicine, a kind of ardent or burning fever uſually attending on eryſipelaſes of any of the viſcera. Of this diſorder, according to Hippocrates, there are five ſpecies. The firſt is a legitimate continual fever, which impairs the ſtrength, is accompanied with a pain of the belly, and a preternatural heat of the eyes, hinders the patient from looking ſteadily on any object whatſoever, and renders him unable, in conſequence of the violent pain, to ſpeak. The ſecond ſpecies begins with a tertian or quartan fever. The patient diſcharges a great quantity of ſaliva and worms at his mouth; his eyes are painful, his feet, and ſometimes his whole body, are ſeized with ſoft ſwellings. His breaſt and back are now and then painful; his belly rumbles, his eyes are fierce, he ſpits a great deal, and his ſaliva ſticks to his throat. The third ſpecies is known by intenſe pains in the joints, and ſometimes over all the body; the blood contaminated by the bile, becomes hot, and ſtagnates in the limbs. The fourth ſpecies is known by a violent tenſion, elevation, and heat of the abdomen, ſucceeded by a diarrhœa, which ſometimes ends in a dropſy. The fifth ſpecies is not unlike the firſt. See the article FEVER.

TYPHOIDEA, in botany, the ſame with phleum.

phleum. See the article PHLEUM.

TYPHOMANIA, τυφομανια, in medicine, a disorder of the brain, wherein the patient not being able to sleep, tho' greatly inclined thereto, lies with his eyes shut, talks absurdly, and flings himself this way and that. The typhomania is a kind of combination of a frenzy with a lethargy, and is much the same with a coma vigil. See COMA.

TYPOGRAPHY, the art of printing. See the article PRINTING.

TYRANT, *tyrannus*, among the antients, denoted simply a king or monarch. But the ill use several persons invested with that sacred character made of it, has altered the import of the word, and tyrant now carries with it the idea of an unjust and cruel prince, who invades the people's liberty, and rules in a more despotic manner than the laws of nature or the country do allow of.

TYRE, a port-town of Phœnicia, in Asiatic Turky, situated on the coast of the Levant, in east long. 36°, north lat. 32° 32', being antiently the capital of Phœnicia.

TYRNAW, a town of Upper Hungary, situated thirty-five miles north-east of Presburg.

TYROCINIUM, a noviciate, or apprenticeship, in any art or science.

TYRONE, an irish county, in the province of Ulster; bounded by Londonderry, on the north; by Armagh and Laugh-neagh, on the east; by Monaghan and Fermanagh, on the south; and by Donnagal on the west.

TYROSIS, a disorder of the stomach, proceeding from milk coagulated therein.

TYSTED, a town of Denmark, in the province of North Jutland, and territory of Alburg, situated on the gulph of Limford, fifty miles west of Alburg.

TYTH, or TITHE. See TITHE.

TYTHING. See the article TITHING.

# U.

U, or u, the twentieth letter, and fifth vowel, of our alphabet, is formed in the voice by a round configuration of the lips, and a greater extrusion of the under one than in forming the letter o, and the tongue is also more cannulated. The sound is short in *curst*, *must*, *tun*, *tub*; but is lengthened by a final *e*, as in *tune*, *tube*, *&c.* In some words it is rather acute than long; as in *brute*, *flute*, *lute*, *&c.* It is mostly long in polysyllables; as in *union*, *curious*, *&c.* but in some words it is obscure, as in *nature*, *venture*, *&c.* This letter in the form V, or v, is properly a consonant, and as such is placed before all the vowels; as in *vacant*, *venal*, *vibrate*, *&c.* Though the letters v and u had always two sounds, they had only the form v till the beginning of the fourth century, when the other form was introduced, the inconvenience of expressing two different sounds by the same letter having been observed long before. In numerals V stands for five; and with a dash added at top, thus $\overline{V}$, it signifies five thousand.

In abreviations, amongst the Romans, V. A. stood for Veterani assignati; V. B. viro bono; V. B. A. viri boni arbitratu; V. B. F. vir bonæ fidei; V. C. vir consularis; V. C. C. F. vale, conjux charissime, feliciter: V. D. D. voto dedicatur; V. G. verbi gratia; Vir Ve. virgo vestalis; VL. videlicet; V. N. quanto nonarum.

VABRES, a town of Guienne, in France, fifty five miles north east of Toulouse.

VACANCY, in philosophy. See the article VACUUM.

VACANCY, in law, a post, or benefice, wanting a regular officer or incumbent.

VACANT EFFECTS, *prædia vacata*, or *vacua*, are such as are abandoned for want of an heir, after the death or flight of their former owner. A romish benefice is said to be vacant in curia Romana, when the incumbent dies in Rome, or within twenty leagues thereof, though it be only by accident that he was there. The pope nominates to all such benefices.

VACATION, in law, is the whole time betwixt the end of one term and the beginning of another. See TERM.

This word is also applied to the time from

from the death of a bifhop, or other fpiritual perfon, till the bifhopric, or dignity, is fupplied with another.

VACCA MARINA, the SEA-COW, in zoology, the fame with the thrichecus. See the article THRICHECUS.

VACCINIUM, in botany, a genus of the octandria-monogynia clafs of plants, the corolla whereof confifts of a fingle petal, of a campanulated form, and divided into four revolute fegments: at the edge the fruit is a globofe, umbilicated berry, containing four cells: the feeds are few and fmall.

This genus comprehends the black whortle-berries and the marfh-whortle.

VACHA, a town of Germany, forty miles fouth-eaft of Heffe-Caffel.

VACUUM, or VACUITY, in philofophy, denotes a fpace empty, or devoid, of all matter or body. See the articles BODY and SPACE.

It has been the opinion of fome philofophers, particularly the Cartefians, that nature admits not a vacuum, but that the univerfe is entirely full of matter: in confequence of which opinion they were obliged to affert, that if every thing contained in a veffel could be taken out or annihilated, the fides of that veffel, however ftrong, would come together; but this is contrary to experience, for the greateft part of the air may be drawn out of a veffel by means of the air-pump, notwithftanding which it will remain whole, if its fides are ftrong enough to fupport the weight of the incumbent atmofphere.

Should it be objected here, that it is impoffible to extract all the air out of a veffel, and that there will not be a vacuum on that account; the anfwer is, that fince a very great part of the air that was in the veffel may be drawn out, as appears by the more quick defcent of light bodies in a receiver when exhaufted of its air, there muft be fome vacuities between the parts of the remaining air; which is fufficient to conftitute a vacuum. Indeed, to this it may be objected by a cartefian, that thofe vacuities are filled with materia fubtilis, that paffes freely through the fides of the veffel, and gives no refiftance to the falling bodies: but, as the exiftence of this materia fubtilis can never be proved, we are not obliged to allow the objection, efpecially fince Sir Ifaac Newton has found, that all matter affords a refiftance nearly in proportion to its denfity. See the articles PLENUM and CARTESIAN.

There are many other arguments to prove this, particularly the motions of the comets through the heavenly regions, without any fenfible refiftance; the different weight of bodies of the fame bulk, &c.

All the parts of fpaces, fays Sir Ifaac Newton, are not equally full; for if they were, the fpecific gravity of the fluid which would fill the region of the air, could not, by reafon of the exceeding great denfity of its matter, give way to the fpecific gravity of quickfilver, gold, or any body, how denfe foever: whence neither gold, nor any other body, could defcend in the air; for no body can defcend in a fluid, unlefs it be fpecifically heavier than it. But, if a quantity of matter may, by rarefaction, be diminifhed in a given fpace, why may it not diminifh in infinitum? And if all the folid particles of bodies are of the fame denfity, and cannot be rarified, without leaving pores, there muft be a vacuum.

VACUUM BOYLEANUM is fometimes, though improperly, ufed to exprefs the approach to a real vacuum, by means of an air-pump. See the laft article.

VADA, a port-town of Tufcany, ten miles fouth of Leghorn.

VADARI, in the civil-law, denotes a perfon to pledge, undertake, or give fecurity, in behalf of another, that he fhall, on a certain day, appear in court to profecute or anfwer.

VADE-MECUM, or VENI-MECUM, a latin phrafe, ufed, in englifh, to exprefs a thing that is very handy and familiar, and which one ufually carries about with them; chiefly applied to fome favourite book.

VADIMONIUM, in the civil-law, a promife, or bond, given for appearance before the judge upon a day appointed.

VADO, a port-town of Italy, belonging to the Genoefe, thirty fix miles fouthweft of Genoa.

VAENA, a town of Andalufia, in Spain, twenty-five miles fouth-eaft of Cordova: weft long. 4° 6′, north lat. 37° 30′.

VAGABOND, or VAGRANT, in law. See the article VAGRANTS.

VAGINA, properly fignifies a fheath, or fcabbard: and the term vagina is ufed, in architecture, for the part of a terminus, becaufe refembling a fheath, out of which the ftatue feems to iffue.

VAGINA, in anatomy, a large canal, formed of a robuſt and ſtrong membrane, and reaching from the external orifice, or os pudendi, in women, to the uterus. See PUDENDA and UTERUS.

The vagina is uſually about ſix or ſeven fingers breadth long; but is very diſtenſible, and capable of great dilatation; its orifice is narrower than any other part, and cloſed by a ſphincter muſcle: its ſubſtance is membranaceous, and rugoſe internally, and furniſhed with abundance of nervous papillæ; and to this is owing its quick ſenſation: externally it is muſcular, whereby it is enabled to embrace the penis more cloſely in coitu. The rugæ are largeſt in maids, and eſpecially in the anterior part of the vagina; in married women they are much fainter, and ſeem as if worn down; and in women who have born children, they are almoſt entirely obliterated. Their uſe is to encreaſe the pleaſure in coitu, both to the man and to the woman; and to render the part capable of the neceſſary dilatation in parturition. See DELIVERY.

About the mouth of the vagina are found certain lacunæ, or ſmall orifices, capable of admitting a briſtle: they proceed from the glandulæ ſubſtratæ, and ſerve to ſecrete a liquor for lubricating the vagina, and for ſtimulating to venery. See the article LACUNÆ, &c.

The ſphincter, or contracting muſcle, of the vagina, is compoſed of a ſeries of muſcular fibres, ariſing from the ſphincter of the anus, and ſurrounding the orifice of the vagina, after which it is inſerted under the crura of the clitoris. See the article CLITORIS.

The uſe of the vagina is to receive the penis in coition, to emit from the womb the menſtrual diſcharges, the fœtus, the ſecundines, and lochia. See the articles MENSES, DELIVERY, &c.

VAGINALIS, or ELYTROIDES, in anatomy. See the article ELYTROIDES.

VAGRANTS, in law, are deſcribed to be perſons pretending to be patent-gatherers, or collectors for priſons, and wander about for that end; among which are included all fencers, bear-wards, common players of interludes, minſtrels, juglers; all perſons pretending to be gypſies, or wandering in the habits of ſuch, or pretending ſkill in phyſiognomy, palmeſtry, or the like, or to tell fortunes; all ſuch as uſe any ſubtle craft, unlawful games or plays; or, being able in body, run away, leaving their wives or children to the pariſh; all perſons who cannot otherwiſe maintain themſelves, that loiter about and refuſe to work for the uſual wages; and all other perſons wandering abroad and begging, &c.

It is enacted, that where any ſuch vagrants ſhall be found in a pariſh, the conſtable, or other officer, is immediately to apprehend them, and carry them before ſome juſtice of the peace, who ſhall examine the perſons on oath, as to their condition, and places of abode; and thereupon order them to be ſent by paſs to the place of their laſt legal ſettlement; or if that cannot be known, to the place of their birth. The juſtice is to give the conſtable a certificate aſcertaining how, and in what manner, they ſhall be conveyed, &c. And juſtices of the peace, in their ſeſſions, have power to appoint rates for paſſing of vagrants, at ſo much per mile. All conſtables are to make ſearches for theſe people before every quarter-ſeſſions; and in caſe any perſons permit vagrants to lodge in their houſes, barns, or out-houſes, and do not carry them before the next juſtice, or give notice to ſome conſtable, or other pariſh-officer, ſo to do, they ſhall forfeit a ſum not above 40 s. or under 10 s. Alſo, if any charge be brought upon any place by means thereof, the ſame may be levied by diſtreſs and ſale of the offender's goods; for want of which he ſhall be committed to the houſe of correction, and there ſet to hard labour for three months.

VAGUM, or PAR VAGUM, in anatomy, the eighth pair of the nerves ariſing from the medulla oblongata. See NERVES.

VAIHINGEN, a town of Swabia, in Germany, ſituated on the river Neckar, twenty-ſix miles ſouth-weſt of Hailbron.

VAIR, in heraldry, a kind of fur, conſiſting of divers little pieces, argent and azure, reſembling a dutch U, or a bell-glaſs. See plate CCLXXXVIII. fig. 3. Vairs have their point azure oppoſite their point argent, and the baſe argent to the baſe azure.

VAIRY, VAIRE, VERRY, or VARRY, in heraldry, expreſſes a coat, or the bearings of a coat, when charged or chequered with vairs: and hence, vairy-cuppy, or vairy-taſſy, is a bearing compoſed of pieces repreſenting the tops of crutches. See plate CCLXXXVIII. fig. 4.

VAISON, a town of Provence, in France,

29 miles north-east of Avignon.

VALAIS, a territory of Switzerland, being a long valley of an hundred miles extent, lying between the head of the river Rhone and the lake of Geneva.

VALANTIA, CROSS-WORT, in botany, a genus of the polygamia-monoecia class of plants, the corolla of which is monopetalous, but divided into three or four parts; the stamina are either three or four; the pericarpium is coriaceous and compressed, and contains a single globose seed. See plate CCXC. fig. 1.

VALDENSES, in church-history, the same with the albigenses. See ALBIGENSES.

VALENCE, a town of Dauphine, in France, situated at the confluence of the rivers Rhone and Isere, forty eight miles south of Lyons.

VALENCIA, the capital of a province of the same name, in Spain, situated in a fine plain on the river Guadalaviar: west long. 35′, north lat. 39° 20′.

VALENCIA, or VALENZA DE ALCANTARA, a town of Estremadura, in Spain, near the frontiers of Portugal: west longitude 7° 30′, and north latitude 39° 15′.

VALENCIA is also a town of Terra Firma: west long. 67° 30′, north lat. 10°.

VALENCIENNES, a city of french Hainault, situated on the river Schelde, fifteen miles south of Tournay, and eighteen miles south-west of Mons.

VALENTINIANS, in church-history, a sect of christian heretics, who sprung up in the IId century, and were so called from their leader Valentinus.

The valentinians were only a branch of the gnostics, who realized or personified the platonic ideas, concerning the deity, whom they called Pleroma, or plenitude. Their system was this: the first principle is Bythos, *i. e.* depth, which remained many ages unknown, having with it Ennoe, or thought, and Sige, or silence; from these sprung the Nous, or intelligence, which is the only son, equal to, and alone capable of comprehending, the Bythos; the sister of Nous they called Aletheia, or truth: and these constituted the first quaternity of æons, which were the source and original of all the rest: for Nous and Aletheia produced the World and Life; and from these two proceeded Man and the Church. But besides these eight principal æons, there were twenty-two more, the last of which, called Sophia, being desirous to arrive at the knowledge of Bythos, gave herself a great deal of uneasiness, which created in her Anger and Fear, of which was born Matter. But the Horos, or bounder, stopped her, preserved her in the Pleroma, and restored her to her perfection. Sophia then produced the Christ and the Holy Spirit, which brought the æons to their last perfection, and made every one of them contribute their utmost to form the Saviour. Her Enthymese, or thought, dwelling near the Pleroma, perfected by the Christ, produced every thing that is in the world, by its divers passions. The Christ sent into it the Saviour, accompanied with angels, who delivered it from its passions, without annihilating it: from thence was formed corporeal matter. And in this manner did they romance, concerning God, nature, and the mysteries of the christian religion.

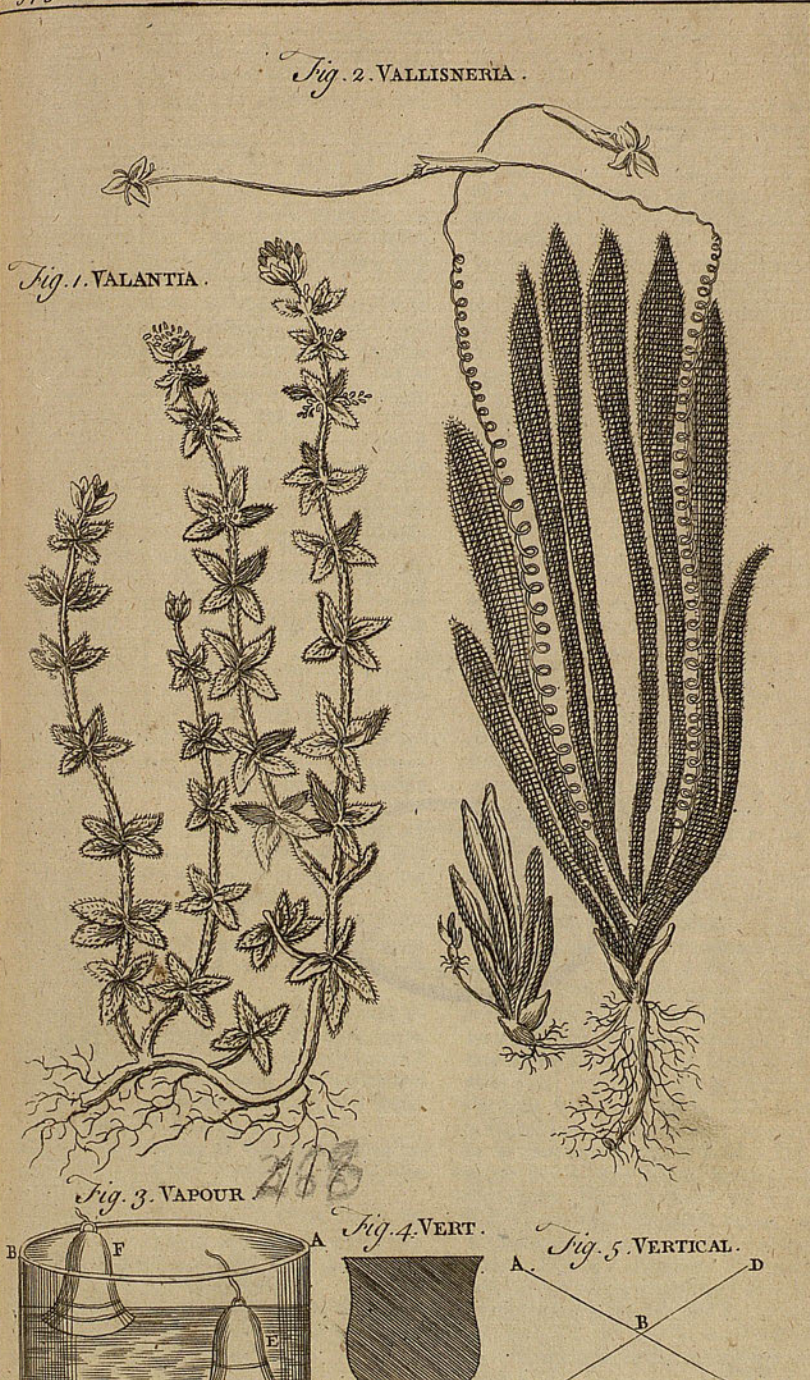
VALENZA, a town of Italy, situated on the river Po, forty-three miles south-west of Milan.

VALERIAN, *valeriana*, in botany, a genus of the triandria-monogynia class of plants, the flower of which consists of a single petal, in form of a tube, prominent in its inferior part, and containing a honey-juice, divided into five segments at the edge, all which are obtuse; the fruit is a capsule, that splits and falls off; and the seeds are single and oblong. These are the characters of the genus; but there is great variation among the different species.

The valerians may be known, when not in flower, by their roots being scented, and their leaves always standing two at a stalk. The great garden-valerian is an alexipharmic, sudorific, and diuretic. The root is the only part of it used in medicine: this is to be taken up in September, and carefully dried. It is given in powder, in asthmas, pleurisies, coughs, obstructions of the liver and spleen, and in the plague, and all malignant and petechial fevers. It is also recommended by some as a vulnerary, and by others as one of the greatest medicines in the world for weaknesses of sight.

The wild valerian-root is much more famous than this, but in a different intention: it is of a strong disagreeable smell, and is given in nervous cases with very great success; there are not wanting instances of persons cured of confirmed epilepsies by it; and in all convulsions it is a very successful medicine.

VALET, a french term, used as a common name for all domestic men servants, employed in the more servile offices, as grooms,




T. Jefferys sculp.


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grooms, footmen, coachmen, &c. But with us, it is only used in the phrase valet de chambre, which is a servant whose office is to dress and undress his master, &c.

VALET, in the manege, a stick armed at one end with a blunted point of iron, to prick and aid a leaping horse.

VALETUDINARY, *valetudinarius*, among medical writers, denotes a person of a weak and sickly constitution, and frequently out of order.

VALID, in law, an appellation given to acts, deeds, transactions, &c. which are clothed with all the formalities requisite to their being put into execution, and to their being admitted in a court of justice. See the articles ACT, DEED, &c.

VALKENBURG, or FAUQUEMONT, a town of the austrian Netherlands, nine miles east of Maestricht.

VALKOWAR, a town of Sclavonia, situated on the Danube, sixty miles northwest of Belgrade.

VALLADOLID, a city of Old Castile, in Spain, eighty-six miles north-west of Madrid: west long. 4° 50′, and north lat. 41° 36′.

VALLADOLID is also a town of Mexico, situated in the province of Honduras: west long. 91°, and north lat. 14°.

VALLAR CROWN, *vallaris corona*, in roman antiquity, the same with that otherwise called castrensis. See the article CROWN.

VALLENGIN, the capital of a county of the same name, in Switzerland, situated near the lake of Neufchattel, twenty-five miles north-west of Bern.

VALLERY, or *St.* VALLERY, a port-town of Picardy, in France, situated on the English channel, forty-five miles north of Rouen.

VALLISNERIA, in botany, a genus of the dioecia-diandria class of plants, with a monopetalous tripartite flower; its fruit is a long, cylindraceous, and unilocular capsule, containing numerous oval seeds. See plate CCXC. fig. 2.

VALOIS, a dutchy of France, situated on the three great rivers the Seine, the Marne, and the Oyse.

VALONA, a port-town of Albania, in european Turky, situated on a fine bay of the gulph of Venice: east long. 20° 5′, and north lat. 41° 6′.

VALPARISA, a port-town of Chili, situated on the Pacific ocean, in west long. 77°, and south lat. 33°.

VALTELINE, a fine fruitful valley, in the south-east division of the country of the Grisons.

VALUE, *valor*, in commerce, denotes the price or worth of any thing: hence the intrinsic value denotes the real and effective worth of a thing, and is used chiefly with regard to money, the popular value whereof may be raised and lowered, at the pleasure of the prince; but its real, or intrinsic value, depending wholly on its weight and fineness, is not at all affected by the stamp or impression thereon.

Value in bills of exchange, is used to signify the nature of the thing (as ready money, bills, debts, merchandizes, &c.) which is given, as it were, in exchange, for the sum specified in the bill. From four different manners of expressing this value, some distinguish four kinds of bills of exchange. The first bears value received, simply and purely, which comprehends all kinds of value; the second value received in money or merchandize; the third value of myself; and the fourth understood. See the article BILL.

VALVE, *valvula*, in hydraulics, pneumatics, &c. is a kind of lid, or cover, of a tube or vessel, so contrived as to open one way; but which, the more forcibly it is pressed the other way, the closer it shuts the aperture; so that it either admits the entrance of a fluid into the tube or vessel, and prevents its return; or admits its escape, and prevents its re-entrance. See the article PUMP.

Mr. Belidore has invented a new kind of valves, the description of which may not be unacceptable to the reader. See plate CCXCI. where fig. 1. represents a round plate of brass, one half of which is chamfered upwards, and the other half downwards. The part CAD, which is greater by one twelfth than the other part B, is tapered on the under side from L to A, as is more evident in fig 5. *ibid.* where the same letters are used. The part B, is tapered on the upper side, as may also be seen in fig. 7, at BM. On the upper side of this plate, nearer B than the center G, is screwed on an axis EHF, on which the plate turns. Fig. 2. shews how this axis is fastened to the plate. Fig. 3. represents the box, or bed, of the valve, chamfered downward on all the semi-circular side L, to receive the part AL, of fig. 1. and the other part B, quite to AA, where the pivots of

of the axis reſt, is chamfered upwards, to receive the part B, of fig. 1. coming up againſt it. From theſe chamfered edges on the inſide, this bed of the valve ſpreads into a flat ring, to be pinched between the flaunches of the pipes, which are ſcrewed together, to make all tight. Fig. 4. repreſents the ſection of this bed; O P being its upper part chamfered downwards, to receive G L A, the greater part of the valve of fig. 1. falling upon it; and Q R chamfered upwards, receives the ſmalleſt part B, of fig. 1. riſing againſt it as it ſhuts. The valve, thus ſhut in its bed, is repreſented in fig. 5. where it may be obſerved, that the pivots of the axis are kept in their places by ſemi-circular bridles, that go over them at C and D. The ſection of the ſame valve ſhut, may be ſeen in fig. 6. where M B H G, repreſents the lower and leſſer part of the valve ſhut, and applied upwards to the under part of the bed at Q R; and L A G H repreſents the greater part of the valve ſhut and applied downwards to the bed at O P. K ſhews one of the bridles pinned, which holds down the pivots, or ends of the axis. Fig. 7. ſhews the valve open, and the manner of its play; where all the paſſage being open between Q K and B I L, and between P O and M H A, it is plain that here is the greateſt water-way poſſible. Now when the valve ſhuts, the end B M moves in the direction of the pricked curve line M Q, and the end L A in the direction of the pricked line L O. When the water is coming downwards, it muſt puſh hard on the part G A L, in fig. 1, 5, 6, and 7. and thereby make the part B H to riſe, by which means the valve will be cloſe ſhut. But when the water comes upwards, as it preſſes with moſt force on the ſurface G A, the part H B will come down, and the valve will immediately open.

Valve, in anatomy, a thin membrane applied on ſeveral cavities and veſſels of the body, to afford a paſſage to certain humours going one way, and prevent their reflux towards the place from whence they came. The veins and lymphatics are furniſhed with valves, which open towards the heart, but keep cloſe towards the extremities of thoſe veſſels; that is, they let the blood and lymph paſs towards the heart, but prevent their returning towards the extreme parts from whence they came. See the article Vein, Heart, Artery, &c.

The upper and, as it were, the lid of the iſthmus, between the teſtes and the firſt vermicular proceſs of the cerebellum, is called the valvula magna, or the great valve of the brain. Its uſe is to prevent the lymph from falling on the nerves, at the baſe of the cranium. See Brain.

The colon has a thick valve to prevent the excrements from paſſing into the ilion, and ſeveral other valves to retard the deſcent of the excrements. See the articles Colon and Excrements.

For the valve of the pyloris, ſee the article Stomach.

For the ſemilunar valves, ſee the article Semilunar.

For that remarkable valve in a fœtus, called by Cheſelden the valvula nobilis, ſee the article Foetus.

For the connivent valves, ſee the article Connivent.

VALVERDE, a town of Portugal, ſituated near the frontiers of ſpaniſh Eſtremadura, twenty-ſeven miles north of Alcantara.

VAN, Vant, or Vaunt, a term derived from the french *avant*, or *avaunt*, ſignifying *before*, or *foremoſt* of any thing: thus we ſay, the van-guard of an army, &c. See the article Guard.

Van is alſo the name of a city of aſiatic Turky, ſituated on a lake of the ſame name, in the province of Turcomania: eaſt long. 44° 30′, and north lat. 38° 30′.

VANDALIA, the antient name of the countries of Mecklenburg and Pomerania, in Germany.

VANELLUS, the lapwing, in ornithology, the black-breaſted tringa, with a hanging creſt. See the article Tringa. This ſpecies is about the ſize of the common pigeon; the head is ſmall, but very beautiful, a little depreſſed on the crown, but not at all on the ſides; the eyes are bright and piercing; the head is elegantly variegated, and is ornamented with a beautiful creſt hanging over the hinder part of the neck.

VANES, on mathematical inſtruments, are ſights made to move and ſlide upon croſs-ſtaves, fore-ſtaves, quadrants, &c. See the article Cross-staff, &c.

VANILLA, in botany, the name by which many call the black-flowered and ſweet-podded epidendrum. See Epidendrum. In commerce, &c. the term vanilla is chiefly applied to the pod of this plant, which is brought to us entire, and with the ſeeds in it; being uſually about five or ſix inches long, and half an inch broad, and

and containing an almoſt innumerable quantity of minute and gloſſy black ſeeds. Vanilla grows in the warmer parts of America, and that uſually in places where there is water near. The natives diſtinguiſh it into three kinds, which the Spaniards call the pompona, the ley, and the ſimarona. The pods of the pompona-kind are thick and ſhort; thoſe of the kind called ley, are longer and ſlenderer; and thoſe of the ſimarona, which is alſo called baſtard-vanilla, are the ſmalleſt of all the kinds. The ley kind is the only good vanilla. It ought to be of a good reddiſh brown, neither too black nor too red, and neither too dry, nor too moiſt; when perfect, they always appear full, though dry; and a parcel of fifty in number ought to weigh above five ounces. There is a kind which is larger, fifty pods of which uſually weigh eight ounces; this is called the ſobre buena, and is eſteemed of all others the moſt excellent.

The ſmell of vanillas ought to be penetrating and agreeable. And when the pods are freſh, and in good condition, they are found, when opened, to be full of a blackiſh, oily, balſamic liquor, in which there ſwim a great number of very ſmall black ſeeds. The ſmell, when the pod is freſh opened, is very lively, and in ſome degree intoxicating.

The pompona-vanilla has a ſtronger but leſs agreeable ſmell than the former; and, when taken, gives men violent headachs, and women diſorders of the womb. The liquid ſubſtance in the pompona is thinner than in the ley, and the ſeeds much larger, being nearly of the ſize of thoſe of muſtard.

The ſimarona, or baſtard-vanilla, has very little liquor, has few ſeeds in the pod, and has ſcarce any ſmell.

The pompona and ſimarona are no ſaleable commodities, nor ever brought to market, except cunningly by the Indians, who mix them among the pods of the ley, or true kind. It is not yet certainly known, however, whether theſe three kinds are the produce of different ſpecies of plants, or whether they differ only as to age, or the ſoil where the plant grows. The time of gathering the pods for ſale, is from September to December. They require no other management than to be gathered in a dry ſeaſon, and laid twenty days, to dry away the ſuperfluous humidity, and, at times, preſſing the pods gently with the hands.

Vanillas are accounted cordial, carminative, ſtomachic, and reſtorative; they are alſo ſaid to be diuretic, and to promote the menſes.

VANNES, or VENNES, a city of Britany, in France, ſituated near the bay of Biſcay, fifty miles north-weſt of Nantz.

VAPORARIUM, in chemiſtry, a vapour-bath; wherein the body, containing the ingredients, is ſo placed as to receive the fumes of boiling water. See the articles BATH and HEAT.

VAPOUR, *vapor*, in philoſophy, the moiſt and moſt volatile particles of bodies, ſeparated by heat, and raiſed into the atmoſphere. See the articles EXHALATION and ATMOSPHERE.

That vapours are raiſed from the ſurface of water, and moiſt bodies, by the action of the ſun's heat, is agreed on by all: but the manner in which this is done, continues ſtill a controverted point among philoſophers. If we conſult a carteſian upon this head, he immediately tells us, that ſmall particles of water being formed into hollow ſpheres by the ſun's heat, filled with their materia ſubtilis, and by that means becoming lighter than air, are eaſily buoyed up in it: but as this materia ſubtilis is only a fiction, this ſolution is not to be regarded. See the article VACUUM.

Dr. Nieuwentyt, and ſeveral other philoſophers who maintain, that fire is a particular ſubſtance diſtinct from other matter, account for the formation and aſcent of vapours thus: they ſay, that the rays of the ſun, or particles of fire ſeparated from them, adhering to particles of the water, make up little bodies, lighter than an equal bulk of air; which, therefore, by the laws of hydroſtatics, will aſcend in it, till they come to an height where the air is of the ſame ſpecific gravity with themſelves; and that rain is produced by the ſeparation of the particles of the fire from thoſe of the water; which laſt, being then left without ſupport, can no longer be ſuſtained by the air, but falls down in drops of rain. See RAIN, DEW, &c.

This opinion is liable to the following difficulties: firſt, fire has never been yet proved to be a diſtinct element, or a particular ſubſtance; and the change of weight in bodies in chemical preparations, heretofore thought to ariſe from the adheſion of particles of fire, is found to proceed from the adheſion of particles of air. See the articles FIRE and AIR.

Secondly, ſhould the above-mentioned ſuppoſition

ſuppoſition be allowed, the fiery particles, which are joined to the watery ones to buoy them up, muſt be conſiderably large, or elſe a very great number muſt fix upon a ſingle particle of water; and then a perſon, being on the top of an hill in the cloud, would be ſenſible of the heat, and find the rain, produced from that vapour, much colder than the vapour itſelf: whereas the contrary is evident to our ſenſes; the tops of hills, though in the clouds, being much colder than the rain which falls below.

Beſides, the manner in which the particles of water ſhould be ſeparated from thoſe of the fire, ſo as to fall in rain, is not eaſily to be conceived.

The moſt generally received opinion is, that by the action of the ſun on the ſurface of the water, the aqueous particles become formed into bubbles, filled with a flatus, or warm air, which renders them ſpecifically lighter than common air, and makes them riſe therein, till they meet with ſuch as is of the ſame ſpecific gravity with themſelves. But Mr. Rowning aſks, Firſt, How comes the air in the bubbles to be ſpecifically lighter than that without, ſince the ſun's rays, which act upon the water from whence they are raiſed, are equally denſe over all its ſurface?

Secondly, If it could be poſſible for rarer air to be ſeparated from the denſer ambient air, to form the bubbles (as bubbles of ſoaped water are blown up by warm air from the lungs, whilſt the ambient air is colder and denſer) what would hinder the external air from reducing that, which is incloſed in the bubbles, immediately to the ſame degree of coldneſs and ſpecific gravity with itſelf (cold being readily communicated thro' ſuch thin ſhells of water); by which means the bubbles would become ſpecifically heavier than the circumambient air, and would no longer be ſupported therein, but fall down, almoſt as ſoon as they were formed?

Thirdly, If we ſhould grant all the reſt of the ſuppoſition, yet the following difficulty will ſtill remain. If clouds are made up of bubbles of water filled with air, why do not theſe bubbles always expand, when the ambient air is rarefied, and preſſes leſs upon them than it did before; and why are they not condenſed, when the ambient air is condenſed by the accumulation of the ſuperior air? But if this condenſation and rarefaction ſhould happen to them, the clouds would always continue at the ſame height, contrary to obſervation; and we ſhould never have any rain.

The two laſt opinions are more largely examined by Dr. Deſaguliers in the Philoſophical Transactions, nº 407. After which, he endeavours to eſtabliſh one of his own.

He obſerves, with Sir Iſaac Newton, that when by heat or fermentation the particles of a body are ſeparated from their contact, their repulſive force grows ſtronger, and the particles exert that force at greater diſtances; ſo that the ſame body ſhould be expanded into a very large ſpace, by becoming fluid; and may ſometimes take up more than a million of times the room it did in a ſolid and incompreſſible ſtate. "Thus, ſays he, if the particles of water are turned into vapour, by repelling each other ſtrongly, and repel air more than they repel each other; aggregates of each particles, made up of vapour and vacuity, may ariſe in air of different denſities, according to their own denſity depending on their degree of heat." He obſerves farther, that heat acts more powerfully on water, than on common air; for that the ſame degree of heat, which rarefies air two-thirds, will rarefy water near fourteen thouſand times, changing it into ſteam or vapour, as it boils it. And in winter, that ſmall degree of heat, which, in reſpect of our bodies, appears cold, will raiſe a ſteam or vapour from water, at the ſame time that it condenſes air. Laſtly, he obſerves, that the denſity and rarity of this vapour depends chiefly on its degree of heat, and but little on the preſſure of the circumambient air. From all which he infers, that the vapour being more rarefied near the ſurface of the earth, than the air is there by the ſame degree of heat, muſt neceſſarily be buoyed up into the atmoſphere; and ſince it does not expand itſelf much, though the preſſure of the incumbent air grows leſs, at length it finds a place where the atmoſphere is of the ſame ſpecific gravity with itſelf, and there floats, till, by ſome accident or other, it is converted again into drops of water, and falls down in rain.

And to ſhew that air is not neceſſary for the formation of ſteam or vapour, he gives us this experiment: ABCD (plate CCXC, fig. 3.) is a pretty large veſſel of water, which muſt be ſet upon the fire to boil. In this veſſel muſt be ſuſpended the glaſs bell E, made heavy enough

enough to fink in water; but put in, in fuch a manner, that it be filled with water, when upright, without any bubbles of air at its crown within, the crown being all under water. As the water boils, the bell will, by degrees, be emptied of its water, the water in the bell being preffed down by the fteam which rifes from it; but, as that fteam has the appearance of air, in order to know whether it be air or not, take the veffel off the fire, and draw up the bell by a ftring faftened to its knob or top, till only the mouth remains under water; then, as the fteam condenfes by the cold air on the outfide of the bell, the water will rife up into the bell at F, quite to the top, without any bubble above; which fhews, that the fteam, which kept out the water, was not air.

VAPOURS, in medicine, a difeafe properly called hypo, or the hypochondriacal difeafe, and in men, particularly, the fpleen. See HYPOCHONDRIAC PASSION.

VARI, in medicine, little hard and ruddy tumours, which frequently infeft the faces of young perfons of a hot temperament of body; for curing which cathartics, and a cooling diluting diet are moft proper.

VARIABLE QUANTITIES, in geometry and analytics, denote fuch as are either continually increafing or diminifhing; in oppofition to thofe which are conftant, remaining always the fame. See the articles QUANTITY and FLUXION.

VARIANCE, in law, is an alteration of fomething formerly laid in a plea: but where a plea is good in fubftance, it is held, that a fmall variance fhall not hurt it. Where the defendant pleads variance between a writ and declaration, he muft crave oyer of the writ before he fhall take any advantage thereof; and this is becaufe the writ and the declaration are not upon the fame roll: it is likewife obferved, that if in one roll a declaration is entered as in debt, and in another as in trefpafs, this is fuch a variance, that if the plaintiff has judgment it fhall be reverfed.

By the 16 and 17 Car. II. c. 8. all variances, *&c.* that are not againft the right of the matter of the fuit, fhall be amended.

VARIATION, in geography and navigation, is the deviation of the magnetical needle, in the mariner's compafs, from the true north point, towards either the eaft or weft; or it is an arch of the horizon, intercepted between the meridian of the place of obfervation and the magnetic meridian. See NEEDLE.

The caufe of this variation of the needle has remained hitherto without any demonftrative difcovery; yet fince its declination, and inclination (or dipping) do both of them manifeftly indicate the caufe to be fomewhere in the earth, it has given occafion to philofophers to frame hypothefes for a folution, which make the earth a large or general magnet or loadftone, of which all the leffer ones are but fo many parts or fragments, and being poffeffed of the fame virtue, will, when left to move freely, have the fame difpofition and fimilarity of pofition, and other circumftances. See EARTH and MAGNET.

The moft confiderable of thefe hypothefes is that of the late fagacious Dr. Halley, which is this: the globe of the earth is one great magnet, having four magnetical poles or points of attraction, near each pole of the equator two; and that in thofe parts of the world which lie near adjacent to any one of thofe magnetical poles, the needle is chiefly governed thereby, the neareft pole being always predominant over the more remote one. Of the north poles, that which is neareft to us, he fuppofes to be in the meridian of the Land's-end, which governs the variations in Europe, Tartary, and the North-fea; the other he places in a meridian paffing through California, about 15° from the north pole of the world, which governs the needle in north America, and the oceans on either fide. In like manner he accounts for the variations in the fouthern hemifphere. See Philof. Tranf. n° 148.

The variation of the needle from the north and fouth points of the horizon, not being the fame, but variable in different years, and in a diverfe manner in different parts of the earth, made the doctor farther conjecture, that two of the magnetic poles were fixed, and two moveable; and in order to make this out, he fuppofes the external part of the earth to be a fhell or cortex, containing within it a magnetic moveable nucleus of a globular form, whofe center of gravity is the fame with that of the earth, and moveable about the fame axis.

Now, if the motions of both the fhell and nucleus were the fame, the poles of each would always have the fame pofition to each other; but he fuppofes the motion of the nucleus to be a very fmall matter

lefs

lefs than that of the fhell, which yet is fcarce fenfible in 365 revolutions; and, if fo, the magnetic poles of the nucleus will by flow degrees change their diftance from the magnetic poles of the fhell, and thus caufe a variation in that needle's variation, which is governed by the moveable pole of the nucleus, while that variation which refpects the fixed poles of the magnetic fhell remains more conftant; as in Hudfon's-bay the change is not obferved to be near fo faft as in thefe parts of Europe.

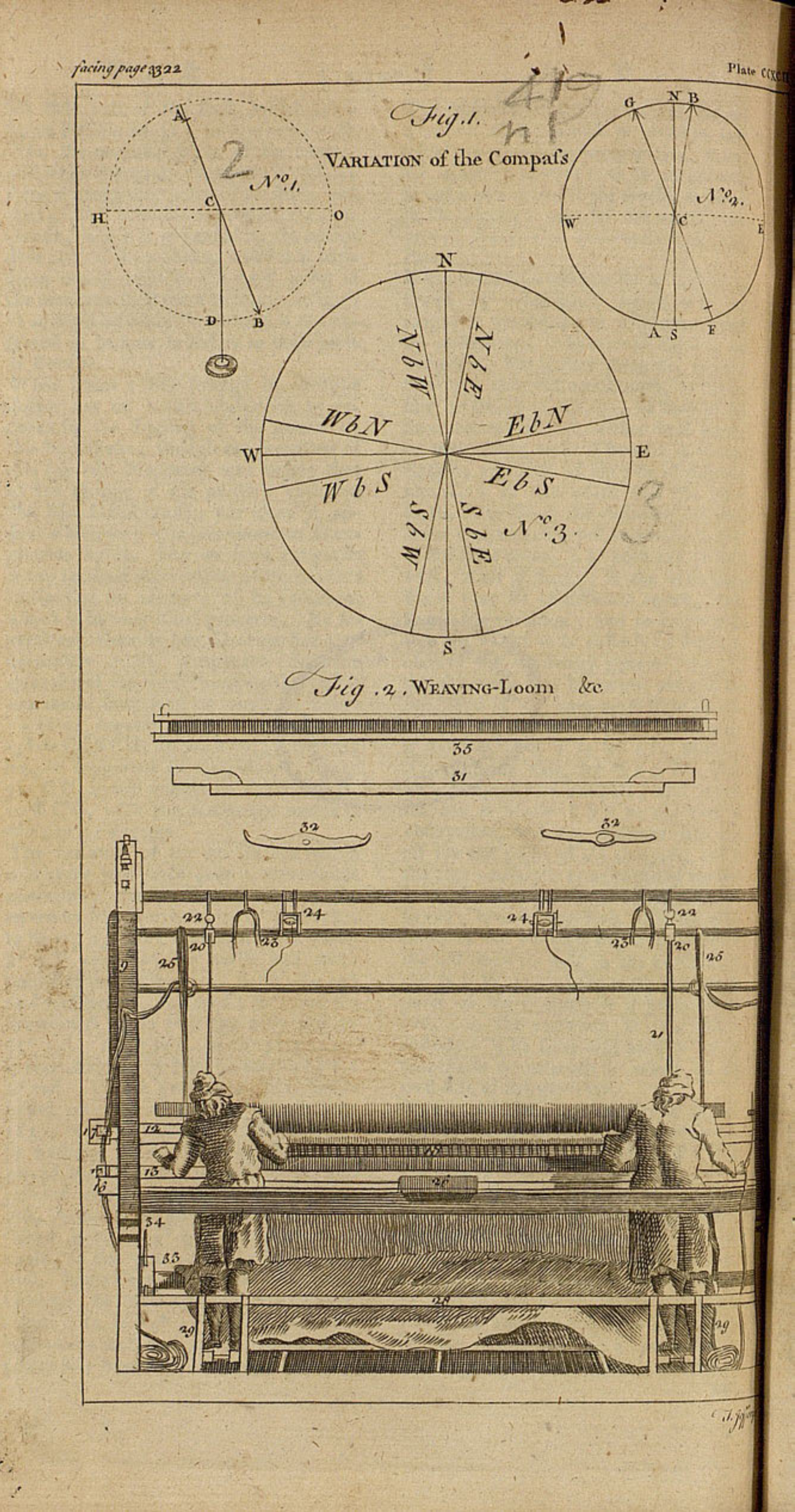
What feems a little ftrange is, that the doctor has no where undertook to account for the dipping of the needle by this hypothefis; though the invention of this (by Mr. Blagrave) was before that of the change of the needle's variation (by Mr. Gellibrand); nor does it appear which way this phænomenon is explicable by it. But we have not yet fo many accurate obfervations of the needle's inclination as we have of its variation, which is its only ufual property. By feveral experiments Mr. Graham has very accurately made, it appears, that the quantity of the needle's inclination to the horizontal line, was an angle of about 74 or 75 degrees: that is, fuppofe A B (plate CCXCII. fig. 1. n° 1.) a touched needle fupported on the point C, of the pin C D, it will remain an angle A C H, or B C O, with the horizontal line H O of 74 or 75 degrees.

The variation of the needle has within a century paft undergone a remarkable alteration; for at London it was obferved by Mr. Burrows, in the year 1580, to be 11° 15′ eaft; that is, if N. S. (*ibid.* n° 2.) reprefent the north and fouth points of the horizon, and E. W. the eaft and weft points, the needle then had the fituation A B, fo that the arch B N = 11° 15′. After that, in the year 1622, it was obferved by Mr. Gunter to be but 6° eaft. In the year 1634, Mr. Gellibrand obferved it to be 4° 5′ eaft. In 1657, it was obferved by Mr. Bond to be nothing at all, that is the needle placed itfelf in the fituation S. N. and pointed directly to the north. After this, in the year 1672, Dr. Halley obferved it to be 2° 30′ weftward; and again, in the year 1692, he found it 6° weft. Since then, in the year 1722, Mr. Graham, by moft accurate experiments, found it to be 14° 13′, and at prefent it is between 15° and 16°; and in fome places it is found 18° weftward.

The variation of the declination and inclination of the needle is variable, and fubject to no regular computation. What the quantity of both forts of variation is in the feveral parts of the world, is fhewn in Dr. Halley's map of the world, improved from the obfervations of Mr. Pound.

If the fun's true amplitude or azimuth, found by calculation, agree with the magnetic amplitude or azimuth, found by obfervation, it is evident there is no variation: but if they difagree, and the true and obferved amplitudes, at the rifing or fetting of the fun, be both of the fame name; that is, either both north, or both fouth, their difference is the variation: whereas, if they be of different names, *i. e.* one north and the other fouth, their fum is the variation. Again, if the true and obferved azimuths be both of the fame name, *i. e.* both eaft or both weft, their difference is the variation; but if they be of different names, their fum is the variation: and to know whether the variation be eafterly or wefterly, obferve the following general rule; let the obferver's face be turned towards the fun, then if the true amplitude or azimuth be to the right-hand, the variation is eafterly; but if to the left, wefterly. To illuftrate this, let N E S W. (*ibid.* n° 3.) reprefent a compafs; and fuppofe the fun is really E b S at the time of obfervation, but the obferver fees him off the eaft point of the compafs, and fo the true amplitude or azimuth of the fun is to the right of the magnetic, or obferved: here it is evident, that the E b S point of the compafs ought to lie where the eaft point is, and fo the north where the N b W is; confequently the north point of the compafs is a point too far eaft, *i. e.* the variation in this cafe is eafterly. The fame will hold when the amplitude or azimuth is taken on the weft-fide of the meridian.

Again, let the true amplitude or azimuth be to the left-hand of the obferved; thus fuppofe the fun is really E b N at the time of obfervation, but the obferver fees him off the eaft point of the compafs, and fo the true amplitude or azimuth to the left of the obferved: here it is evident, that the E b N point of the compafs ought to ftand where the eaft point is, and fo the north where the N b E point is; confequently the north point of the compaffes lies a point too far wefterly, fo in this cafe the variation is weft.


Fig. 1. VARIATION of the Compass
N°. 1.
A
C
H
O
D
B
N°. 2.
G
N
B
W
C
E
A
S
F
N°. 3.
N
NbW
NbE
WbN
EbN
W
E
WbS
EbS
SbW
SbE
S
Fig. 2. WEAVING-LOOM &c.
35
31
32
32
22
24
24
22
20
23
23
20
25
25
21
26
28
29
29
34
33
17
16

west. The same will hold when the sun is observed on the west-side of the meridian.

Suppose the sun's true amplitude at rising is found to be E. 14°, 20′ N. but by the compass it is found to be E. 26°, 12′ N. Required the variation, and which way it is.

Since they are both the same way, therefore,

From the magnetic ampl. E. 26°, 12′N.
take the true amplitude - E. 14°, 20′N.
and there remains the varia. 11, 52 E.

which is easterly, because in this case the true amplitude is to the right of the observed.

VARIATION *of the moon*, in astronomy, is the third inequality observed in that planet's motion. See the article MOON.

VARIATION *of the variation*, is the change in the declination of the needle, observed at different times in the same place.

VARIATION *of quantities*, in algebra. See the article COMBINATION.

VARIATION *of curvature*, in geometry, is used for that inequality or change, which happens in the curvature of all curves, except the circle; and this variation or inequality constitutes the quality of the curvature of any line. See the article CURVE.

Sir Isaac Newton makes the index of the inequality or variation of curvature to be the ratio of the fluxion of the radius of curvature to the fluxion of the curve; and Mr. Mac Laurin, to avoid the perplexity that different notions, connected with the same terms, occasion to learners, has adapted the same definition; but he suggests, that this ratio gives rather the variation of the ray of curvature, and that it might have been proper to have measured the variation of curvature, rather by the ratio of the fluxion of curvature itself to the fluxion of the curve; so that the curvature being inversely as the radius of the curvature, and consequently its fluxion as the fluxion of the radius itself directly, and the square of the radius inversely, its variation would have been directly, as the measure of it, according to Sir Isaac's definition, and inversely, as the square of the radius of curvature.

VARIATION, in music, is understood of the different manners of playing or singing a tune or song, whether by subdividing the notes into several others of lesser value, or by adding graces, *&c.* in such manner, however, as that one may still discern the ground of the tune through all the enrichments; which are called embroideries.

VARICIFORMES PARASTATÆ, in anatomy, a name which some authors give to two vessels near the bladder, by reason of their many turnings, serving to work and prepare the seed the better. See PARASTATÆ and DEFERENTIA VASA.

VARICOSUM CORPUS, in anatomy, the same as corpus pyramidale. See the article PYRAMIDALIA CORPORA.

VARIEGATION, among botanists and florists, the act of streaking or diversifying the leaves, *&c.* of plants and flowers with several colours.

Variegation is either natural or artificial. Of natural variegation there are four kinds; the first shewing itself in yellow spots here and there, in the leaves of plants, called, by gardeners, the yellow bloach. The second kind, called the white bloach, marks the leaves with a great number of white spots, or stripes; the whitest lying next the surface of the leaves, usually accompanied with other marks of a greenish white, that lie deeper in the body of the leaves. The third, and most beautiful, is where the leaves are edged with white, being owing to some disorder or infection in the juices, which stains the natural complexion or verdure of the plant. The fourth kind is that called the yellow edge.

Artificial variegation is performed by inarching or inoculating a striped or variegated plant into a plain one of the same sort; as a variegated common jessamin into a plain, common, spanish, brazil, or indian jessamin.

A single bud or eye, Mr. Bradley observes, being placed in the escutcheon of a distempered tree, where it can only receive nourishment from the vitiated juices, will become variegated proportionably to the nourishment it draws, and will partake more of the white and yellow juice, than if a branch should be inarched, the bud having nothing to nourish it but the juices of the plant it is inoculated on; whereas a cyon inarched is fed by the striped plant, and the healthful one.

As to the natural stripes or variegations, there are some particular circumstances to be observed: 1. That some plants only appear variegated or bloached in the spring and autumn, the stains disappearing as they gather strength: of this kind are rue, thyme, and marjoram. 2. Some plants are continually bloached in the spongy part of their leaves: the sap-vessels,

veſſels, all the time, remaining of a healthful green: ſuch are the alternus, orange-mint, &c. which, being ſtrengthened by rich manure, or being inarched in healthful plants, throw off the diſtemper. 3. In other plants, the diſeaſe is ſo rooted and inveterate, that it is propagated with the ſeed: ſuch are the archangel, water-betony, bank-creſs, borrage, ſtriped cellary, and ſycamore; the ſides of which produce ſtriped plants.

VARIOLÆ, the SMALL-POX, in medicine. See the article POX.

VARIORUM, or *cum notis* VARIORUM, in matters of literature, denotes an edition of a claſſic author, with notes of divers authors thereupon: theſe editions are generally moſt valued.

VARIX, in medicine, the dilatation of a vein, ariſing from the too great abundance or thickneſs of the blood; the cure of which is to be attempted by evacuations, as phlebotomy and cathartics; as alſo by external applications, as diſcutient fomentations, cataplaſms, embrocations, &c. or, where the caſe grows dangerous, by inciſion.

VARNA, a town of Bulgaria, in european Turky, ſituated on the weſtern coaſt of the Black-ſea, an hundred and twenty miles north of Conſtantinople.

VARNISH, or VERNISH, a thick, viſcid, ſhining liquor, uſed by painters, gilders, and various other artificers, to give a gloſs and luſtre to their works; as alſo to defend them from the weather, duſt, &c.

There are ſeveral kinds of varniſhes in uſe; as the ſiccative or drying varniſh, made of oil of aſpin, turpentine, and ſandarach melted together. White varniſh, called alſo venetian varniſh, made of oil of turpentine, fine turpentine, and maſtic. Sipirit of wine varniſh, made of ſandarach, white amber, gum elmi, and maſtic; ſerving to gild leather, picture-frames, &c. withal. Alſo the gilt-varniſh, china-varniſh, common-varniſh, &c.

1. To make the white varniſh: take gum ſandarach, of the cleareſt and whiteſt ſort, eight ounces; gum maſtic, of the cleareſt ſort, half an ounce; of ſarcocolla, the whiteſt, three quarters of an ounce; venice-turpentine, an ounce and a half; benzoin, the cleareſt, one quarter of an ounce; white roſin, one quarter of an ounce; gum animæ, three quarters of an ounce: let all theſe be diſſolved, and mixed in the manner following:

Put the ſarcocolla and roſin into a little more ſpirits than will cover them to diſſolve; then add the benzoin, gum animæ, and venice-turpentine, into either a glaſs or glazed earthen veſſel, and pour on as much ſpirits as will cover them an inch; then put the gum-maſtic into a glaſs or glazed veſſel, and pour ſtrong ſpirits upon it, covering it alſo about an inch thick, to diſſolve it rightly; then put your gum elemi into a diſtinct veſſel as before, and cover it with ſpirits to diſſolve.

For this purpoſe, you need only break the roſin a little, and powder the gum animæ, ſarcocolla, and benzoin.

Let all ſtand three or four days to diſſolve, ſhaking the glaſſes, &c. two or three times a day, and afterwards put them all together into a glazed veſſel, ſtirring them well, and ſtrain the liquor and gums gently, beginning with the gums, through a linen-cloth.

Then put it into a bottle, and let it ſtand a week before you uſe it, and pour off as much of the clear only, as you think ſufficient for preſent uſe.

2. The white amber-varniſh is thus made according to Mr. Boyle: take white roſin four drams, melt it over the fire in a clean glazed pipkin; then put into it two ounces of the whiteſt amber you can get, finely powdered. This is to be put in by a little and a little, gradually, keeping it ſtirring all the while with a ſmall ſtick, over a gentle fire, till it diſſolves, pouring in now and then a little oil of turpentine, as you find it growing ſtiff; and continue ſo to do till all your amber is melted.

But great care muſt be taken not to ſet the houſe on fire, for the very vapours of the oil of turpentine will take fire by heat only; but if it ſhould happen ſo to do, immediately put a flat board or wet blanket over the fiery pot, and by keeping the air from it you will put it out, or ſuffocate it.

Therefore it will be beſt to melt the roſin, in a glaſs of a cylindric figure, in a bed of hot ſand, after the glaſs has been well annealed, or warmed by degrees in the ſand, under which you muſt keep a gentle fire.

When the varniſh has been thus made, pour it into a coarſe linen-bag, and preſs it between two hot boards of oak or flat plates of iron; after which it may be uſed with any colours in painting, and

alſo for varniſhing them over when painted.

But for covering gold, you muſt uſe the following varniſh: mean time, it is to be obſerved, that when you have varniſhed with white varniſh, you may put the things varniſhed into a declining oven, which will harden the varniſh.

3. A hard varniſh that will bear the muffle, may be thus made: take of colophony, an ounce; ſet it over the fire in a well-glazed earthen veſſel, till it is melted; then by little and little, ſtrew in two ounces of powder of amber, keeping it ſtirring all the while with a ſtick; and when you perceive it begin to harden or reſiſt the ſtick, then put in a little turpentine oil, which will thin and ſoften it immediately; then put in two ounces of gum copal, finely powdered, ſprinkling it in as you did the amber, now and then pouring in a little oil of turpentine; and when it is done, ſtrain it as before directed.

This is proper to varniſh over gold; and the things done with it muſt be ſet into a declining oven, three or four days ſucceſſively, and then it will reſiſt even the fire itſelf.

4. To make a varniſh for braſs, that will cauſe it to look like gold. Take two quarts of ſpirit of wine, and put it into a retort-glaſs; then add to it an ounce of gamboge, two ounces of lacca, and two ounces of maſtic; ſet this in a ſand-heat for ſix days, or elſe near a fire, or you may put the body of the bolt-head frequently into warm water, and ſhake it two or three times a-day; then ſet it over a pan of warm ſaw-duſt. But before this varniſh is laid over the metal, let it be well cleaned.

This is a good varniſh to mix with any colours that incline to red, and the amber varniſh for mixing with thoſe that are pale.

5. To make a varniſh for gold, or metals made in imitation of gold. Take colophony, and, having melted it, put in two ounces of amber finely powdered, and ſome ſpirit of turpentine, and, as the amber thickens, keep it well ſtirring; then put in an ounce of gum elemi, well pulverized, and more ſpirit of turpentine; conſtantly ſtirring the liquor till all is well mixed and incorporated: but take care, however, to uſe as little turpentine as you can, becauſe, the thicker the varniſh is made, the harder it will be. Let this be done over a ſand-heat, in an open glaſs; then ſtrain it, as is directed for the preceding varniſh. This varniſh is to be uſed alone, firſt warming the veſſels made of paper-paſte; and lay it on with a painting-bruſh before the fire, but not too near, leſt the fire raiſe it into bliſters. After this has been done, harden it three ſeveral times in ovens; firſt with a ſlack heat, the next with a warmer, and the third with a very hot one; and the veſſels will look like poliſhed gold.

And as for ſuch veſſels, *&c.* as ſhall be made with ſaw-duſt and gums, the varniſh may be made of the ſame ingredients as above-mentioned, except the gum-elemi; and this will dry in the ſun, or in a gentle warmth.

6. To make a varniſh for any thing covered with leaf-ſilver. Firſt paint the thing over with ſize, and ground chalk or whiting; let them ſtand till they are thoroughly dry, and then do them over with very good gold-ſize, of a bright colour (for there is much difference in the colour of it; ſome being yellow, and others almoſt white; the firſt is moſt proper for gold, and the laſt for ſilver.) When this ſize is ſo dry as that it will juſt ſtick a little to the touch, lay on the leaf-ſilver, and cloſe it well to the ſize.

7. To make a varniſh for ſilver. Melt, in a well glazed pipkin, ſome fine turpentine, and put in three ounces of white amber, finely powdered (more or leſs, according to the quantity your work will require) put it in by little and little, keeping it continually ſtirring, adding by degrees ſome ſpirit of turpentine, till all the amber is diſſolved; and then add to it an ounce of ſarcocolla well beaten, and an ounce of gum elemi well levigated, adding now and then a little ſpirit of turpentine, till all is diſſolved: do this over a gentle fire, and keep it conſtantly ſtirring.

This varniſh will be as white and ſtrong as the former; and is to be uſed warm, and hardened by degrees in an oven, as varniſhed gold, whereby it will look like poliſhed ſilver.

*Laying on of* VARNISHES. 1. If you varniſh wood, let your wood be very ſmooth, cloſe-grained, free from greaſe, and rubbed with ruſhes. 2. Lay on your colours as ſmooth as poſſible; and, if the varniſh has any bliſters in it, take them off by a poliſh with ruſhes. 3. While

While you are varnifhing, keep your work warm, but not too hot. 4. In laying on your varnifh, begin in the middle, and ftroke the brufh to the outfide; then to another extreme part, and fo on till all be covered; for if you begin at the edges, the brufh will leave blots there, and make the work unequal. 5. In fine works ufe the fineft tripoli in polifhing: do not polifh it at one time only; but, after the firft time, let it dry for two or three days, and polifh it again for the laft time. 6. In the firft polifhing you muft ufe a good deal of tripoli, but in the next a very little will ferve: when you have done, wafh off your tripoli with a fponge and water: dry the varnifh with a dry linen-rag; and clear the work, if a white ground, with oil and whiting; or, if black, with oil and lamp-black.

VARNISH alfo fignifies a fort of fhining coat, wherewith potter's ware, delft-ware, china-ware, *&c.* are covered, which gives them a fmoothnefs and luftre. Melted lead is generally ufed for the firft, and fmalt for the fecond. See the article GLAZING.

VARNISH, among medalifts, fignifies the colours antique medals have acquired in the earth.

The beauty which nature alone is able to give to medals, and art has never yet attained to counterfeit, enhances the value of them; that is, the colour, which certain foils, in which they have a long time lain, tinges the metals withal; fome of which are blue, almoft as beautiful as the turquoife; others with an inimitable vermilion colour; others with a certain fhining polifhed brown, vaftly finer than brafil figures.

The moft ufual varnifh is a beautiful green, which hangs to the fineft ftrokes without effacing them, more accurately than the fineft enamel does on metals.

No metal but brafs is fufceptible of this; for the green ruft that gathers on filver always fpoils it, and it muft be got off with vinegar or lemon-juice.

Falfifiers of medals have a falfe or modern varnifh, which they ufe on their counterfeits, to give them the appearance, or air, of being antique. But this may be difcovered by its foftnefs, it being fofter than the natural varnifh, which is as hard as the metal itfelf.

Some depofite their fpurious metals in the earth for a confiderable time, by which means they contract a fort of varnifh, which may impofe upon the lefs knowing; others ufe fal armoniac, and others burnt paper.

VAS, a veffel either for mechanical, chemical, culinary, or any other ufes. In anatomy, all the parts which convey a fluid are called veffels, as the veins, arteries, and lymphatics.

VASA CONCORDIÆ, among hydraulic authors, are two veffels, fo conftructed as that one of them, though full of wine, will not run a drop; unlefs the other, being full of water, do run alfo. Their ftructure and apparatus may be feen in Wolfius Element. Mathef. t. I. Hydraul.

VASCULAR, in anatomy, fomething confifting of divers veffels; as arteries, veins, nerves, *&c.* See ARTERY, *&c.*

VASCULIFEROUS PLANTS, fuch whofe feeds are contained in veffels, which are fometimes divided into cells.

VASE, a term frequently ufed for antient veffels dug from under ground, or otherwife found, and preferved in the cabinets of the curious.

In architecture, the appellation vafe is alfo given to thofe ornaments placed on corniches, fochles, or pedeftals, reprefenting the veffels of the antients, particularly thofe ufed in facrifice; as incenfe-pots, flower-pots, *&c.* They ferve to crown or finifh facades, or frontifpieces; and hence called acroteria.

The term vafe, however, is more particularly ufed, in architecture, to fignify the body of the corinthian and compofite capital; otherwife called the tambour or drum, and fometimes the campana or bell. See the articles CORINTHIAN and COMPOSITE.

Vafe is fometimes alfo ufed, among florifts, for what is more ufually called the calyx, or cup. See the article CALYX.

VASSAL, in old law-books, denotes a tenant that held land in fee of his lord, to whom he vowed fidelity and fervice. See FEALTY, FEE, HOMAGE, *&c.*

VASSERBURG, or WASSERBURG, a town of Bavaria, in Germany, fituated on the river Inn, thirty miles eaft of Munich.

VASTO, in law, a writ that lies for the heir, or him in reverfion or remainder, againft the tenant for term of life or years, for making wafte. See the article WASTE.

VASTUS, in anatomy, the name of two of the extenfor mufcles of the legs; the one, called vaftus internus, arifes from the whole internal fide of the femur; and the other, called vaftus externus, takes its

its rise from the whole external side of the femur; and both together, with the cruralis and rectus, form a very robust and strong tendon just above the knee, to which the patella adheres behind, and which is inserted below the knee at a tubercle of the tibia. See MUSCLE.

VAT, or FAT, a vessel for holding wine, ale, beer, cyder, &c. in the time of their preparation.

VATERIA, in botany, a genus of the polyandria-monogynia class of plants, the flower of which consists of five oval and patent petals; and its fruit is a turbinated, coriaceous, and unilocular capsule, containing a single oval seed.

VATICAN, a magnificent palace of the pope, in Rome, which is said to consist of several thousand rooms: but the parts of it most admired are the grand staircase, the pope's apartment, and especially the library, which is one of the richest in the world, both in printed books and manuscripts.

VAUDEMONT, the capital of a county of the same name in Lorrain, fifteen miles south-west of Nancy.

VAUDOIS are certain valleys situated north of the marquisate of Saluzzo, in Italy: the chief town is Lucerne. See the article LUCERNE.

VAUDREVANGE, a town of Lorrain, situated on the river Sare, fifty miles north-east of Nancy.

VAUGE, high mountains of Alsace in Germany, which separate it from Lorrain on the west.

VAULT, *fornix*, in architecture, an arched roof, so contrived that the stones which form it sustain each other. See ARCH.

Vaults are, on many occasions, to be preferred to soffits or flat ceilings, as they give a greater height and elevation, and are besides more firm and durable. See the article CEILING.

Salmasius observes, that the antients had only three kinds of vaults. The first was the fornix, made cradle-wise; the second a testudo, *i. e.* tortoise-wise, which the French call cul de four, or oven-wise; and the third concha, or trumpet-wise.

But the moderns have subdivided these three sorts into many more, to which they have given different names, according to their figures and uses; some of them are circular, and others elliptical.

Again, the sweeps of some are larger, others less, portions of a sphere. All such as are above hemispheres, are called high, or surmounted, vaults; and all that are less than hemispheres, are called low, or surbased, vaults, or testudines.

In some vaults the height is greater than the diameter; in others it is less: others, again, are quite flat, and only made with haunses; others like ovens, or in the form of a cul de four, &c. and others growing wider as they lengthen, like a trumpet.

There are also gothic vaults, with ogives, &c. See the article OGIVE, &c.

Of vaults some again are single, others double, cross, diagonal, horizontal, ascending, descending, angular, oblique, pendent, &c.

*Master* VAULTS are those that cover the principal parts of buildings, in contra-distinction to the upper or subordinate vaults, which only cover some little part, as a passage or gate, &c.

*Double* VAULT is one that is built over another, to make the outer decoration range with the inner; or, to make the beauty and decoration of the inside consistent with that of the outside, leaves a space between the concavity of the one and the convexity of the other. Instances of which we have in the dome of St. Peter's at Rome, St. Paul's at London, and in that of the invalids at Paris.

VAULTS *with compartments* are such whose sweep, or inner face, is enriched with pannels of sculpture, separated by platbands. These compartments, which are of different figures, according to the vaults, and usually gilt on a white ground, are made with stone or brick-walls, as in the church of St. Peter at Rome, or with plaister on timber-vaults.

*Theory of* VAULTS. A semi-circular arch or vault, standing on two piedroits, or imposts, and all the stones that compose them, being cut, and placed in such manner as that their joints or beds, being prolonged, do all meet in the center of the vault; it is evident that all the stones must be in the form of wedges; *i. e.* must be wider and bigger at top: by virtue of which they sustain each other, and mutually oppose the effort of their weight, which determines them to fall.

The stone in the middle of the vaults, which stands perpendicular to the horizon, and is called the key of the vault, is sustained on each side by two contiguous stones, just as by two inclined planes; and, consequently, the effort it makes to fall is not equal to its weight.

But still that effort is the greater, as the inclined planes are less inclined; so tha

if they were infinitely little inclined, *i. e.* if they were perpendicular to the horizon as well as the key, it will tend to fall with its whole weight, and would actually fall but for the mortar.

The second stone, which is on the right or left of the key-stone, is sustained by a third, which, by virtue of the figure of the vault, is necessarily more inclined to the second than the second is to the first; and consequently the second, in the effort it makes to fall, employs a less part of its weight than the first. For the same reason, the stones from the key stone employ still a less and less part of their weight to the last, which, resting on a horizontal plane, employs no part of its weight; or, which is the same thing, makes no effort at all, as being entirely supported by the impost.

Now, in vaults, a great point to be aimed at is, that all the voussoirs, or key-stones, make an equal effort towards falling. To effect this, it is visible, that as each (reckoning from the key to the impost) employs still a less and less part of its whole weight; the first, for instance, only employing one half; the second, one third; the third, one fourth, &c. There is no other way of making those different parts equal, but by a proportionable augmentation of the whole; *i. e.* the second stone must be heavier than the first, the third than the second, &c. to the last; which should be infinitely heavier.

M. de la Hire demonstrates what that proportion is, in which the weights of the stones of a semi-circular arch must be increased to be in æquilibrio, or to tend with equal forces to fall, which is the firmest disposition a vault can have.

The architects before him had no certain rule to conduct themselves by, but did all at random. Reckoning the degrees of the quadrant of a circle, from the key-stone to the impost, the extremity of each stone will take up so much the greater arch as it is farther from the key.

M. de la Hire's rule is to augment the weight of each stone above that of the key stone, as much as the tangent of the arch of the stone exceeds the tangent of the arch of half the key. Now the tangent of the last stone of necessity becomes infinite, and of consequence its weight should be so too; but, as infinity has no place in practice, the rule amounts to this, that the last stones be loaded as much as possible, that they may the better resist the effort which the vault makes to separate them; which is called the shoot or drift of the vault.

Mr. Parent has since determined the curve, or figure, which the extrados, or outside of a vault, whose intrados, or inside, is spherical, must have, that all the stones may be in equilibrio.

*Key of a* VAULT is a stone or brick in the middle of the vault, in form of a truncated cone, serving to bind or fasten all the rest. See the article KEY.

*Reins, or fillings up of a* VAULT, are the sides which sustain it.

*Pendentive of a* VAULT is the part suspended between the arches or ogives. See the article PENDENTIVE.

*Impost of a* VAULT is the stone whereon the first voussoir, or arch-stone of the vault, is laid. See IMPOST.

VAUR, a town of Languedoc, in France, eighteen miles west of Toulouse.

UBEDA, a city of Andalusia, in Spain, forty-five miles north-east of Granada: west long. 3° 6′, north lat. 38°.

UBERLINGEN, a town of Swabia, in Germany, ten miles north of Constance.

UBES, or ST. UBES, a city and port-town of Portugal, situated on a fine bay, twenty-one miles south of Lisbon.

UBIQUITARIANS, in church-history, a sect of heretics who sprung up in Germany about the year 1590, and maintained that the body of Jesus Christ is *ubique*, everywhere, or in every place, at the same time. However, they were not quite agreed among themselves; some holding, that the body of Jesus Christ, even during his mortal life, was everywhere; and others dating the ubiquity of his body from the time of his ascension only.

UBIQUITY, omnipresence; an attribute of the Deity, whereby he is always intimately present to all things; gives the esse to all things; knows, preserves, and does all in all things. See GOD.

For, since God cannot be said to exist in all places, as placed therein (because then he would need something to his existence, *viz.* place; and would have extension, parts, &c.) he must be conceived to be everywhere, or in all things, as a first, universal, efficient cause, in all his effects. See CAUSE, &c.

He is present therefore to all his creatures, as a pure act or an exercise of an active virtue, which knows, preserves, governs

governs, &c. every thing. Nor are even finite minds present, otherwise than by operation.

UCKERMUND, a town of Upper Saxony, and dutchy of Pomerania, situated on a bay of the Baltic-Sea, twenty-five miles north-west of Stetin.

UDDER, *uber*, in comparative anatomy, that part in brutes wherein the milk is prepared, answering to the mammæ, or breasts, in women. See BREASTS.

UDENSKOI, a town of Siberia, situated in east long. 96° 30′, north lat. 53°.

UDINA, a town of Friuli, in Italy, twenty-five miles north of Aquileia.

VECHT, a town of Westphalia, in Germany, thirty miles north of Osnabrug.

VECHT is also a river in the United Netherlands; which running from east to west through the province of Overyssel, falls into the Zuyder-sea below Swartsluys.

VECTIS, the LEVER, one of the mechanic powers. See the article LEVER.

VECTOR, in astronomy, a line supposed to be drawn from any planet moving round a center, or the focus of an ellipsis, to that center or focus.

This, by some writers of the new astronomy, is called vector, or radius vector, because it is that line by which the planet seems to be carried round its center, and with which it describes areas proportional to the times. See the articles PLANET, AREA, &c.

VEDETTE, in the military art, a sentinel on horseback detached from the main body of the army, to discover and give notice of the enemies designs.

VEER, a sea-term variously used. Thus veering out a rope, denotes the letting it go by hand, or letting it run out of itself. It is not used for letting out any running rope except the sheet.

VEER is also used in reference to the wind; for, when it changes often, they say it veers about.

VEGETABLE, *vegetabile*, in physiology, a term applied to all plants, considered as capable of growth; *i. e.* all natural bodies which have parts organically formed for generation and accretion, but not sensation. See the article PLANT.

Vegetables, according to the analyses made of them by chemistry, are distinguishable into two grand tribes, the acid and the alkaline; the first affording a volatile acid, and the second a volatile alkali, upon a dry distillation: thus guaiacum, cedar, box, cinnamon, cloves, sorrel, mint, balm, &c. afford an acid; but garlic, leeks, onions, horse-radish, scurvy-grass, mustard, &c. afford an alkali, which, when rectified, is hardly distinguishable from that of animal substances, so as nearly to resemble the spirit and salt of hartshorn.

VEGETATION, in physiology, the act whereby plants receive nourishment and grow. See the article PLANT.

The process of nature, in the vegetation of plants, is very accurately delivered by the excellent Malpighi, to the effect following: The egg, or seed, of the plant being excluded out of the ovary, called pod, or husk, and requiring further fostering and brooding, is committed to the earth; which having received it into her fertile bosom, not only does the office of incubation, by her own warm vapours and exhalation, joined with the heat of the sun; but, by degrees, supplies what the seed requires for its further growth: as abounding everywhere with canals and sinuses, wherein the dew and rain water, impregnated with fertile salts, glide, like the chyle and blood in the arteries, &c. of animals. This moisture, meeting with a new deposited seed, is percolated, or strained through the pores or pipes of the outer rind, or husk, corresponding to the secundines of the fœtuses, on the inside whereof lies one or more, commonly two, thick seminal leaves, answering to the placenta in women, and the cotyledons in brutes. See the articles EGG, SEED, &c.

These seed-leaves consist of a great number of little vesiculæ, or bladders, with a tube corresponding to the navel-string in animals. In these vesiculæ is received the moisture of the earth, strained thro' the rind of the seed; which makes a slight fermentation with the proper juice before contained therein. This fermented liquor is conveyed by the umbilical vessel to the trunk of the little plant; and to the gem, or bud, which is contiguous thereto: upon which a vegetation and increase of the parts succeed.

Such is the procedure in the vegetation of plants; which the illustrious author exemplifies in a grain of wheat, as follows: The first day the grain is sown it grows a little turgid; and the secundine, or husk, gapes a little in several places; and the body of the plant, being continued by the umbilical vessel to a conglobated leaf (which is called the pulp or flesh of the seed, and is what constitutes the flower) swells; by which means, not only

only the gem or ſprout (which is to be the future ſtem) opens, and waxes green, but the roots begin to bunch out; whence the placenta, or ſeed-leaf, becoming looſe, gapes. The ſecond day, the ſecundine, or huſk, being broke through, the ſtem, or top of the future ſtraw, appears on the outſide thereof, and grows upwards by degrees: in the mean time, the ſeed-leaf, guarding the roots, becomes turgid with its veſiculæ, and puts forth a white down. And the leaf being pulled away, you ſee the roots of the plant bare; the future buds, leaves, and reſt of the ſtalk lying hid. Between the roots and the aſcending ſtem the trunk of the plant is knit, by the navel-knot, to the flower-leaf, which is very moiſt, though it ſtill retains its white colour and its natural taſte. The third day, the pulp of the conglobated, or round leaf, becomes turgid with the juice which it received from the earth fermenting with its own.

Thus the plant increaſing in bigneſs, and its bud or ſtem becoming taller, from whitiſh turns greeniſh: the lateral roots alſo break forth greeniſh and pyramidal from the gaping ſheath, which adheres chiefly to the plant; and the lower root grows longer and hairy, with many fibres ſhooting out of the ſame.

Indeed there are hairy fibres hanging all along on all the roots, except on their tips; and theſe fibres are ſeen to wind about the ſaline particles of the ſoil, little lumps of earth, &c. like ivy; whence they grow curled. Above the lateral roots there now break out two other little ones.

The fourth day, the ſtem, mounting upwards, makes a right angle with the ſeminal leaf: the laſt roots put forth more; and the other three, growing larger, are cloathed with more hairs, which ſtraitly embrace the lumps of earth; and where they meet with any vacuity, unite into a kind of net-work.

From this time forward the root puſhes with more regularity downward, and the ſtalk upward, than before. There is, however, this great difference in their growth, that the ſtalk and branches find no reſiſtance to their ſhooting up, while the roots find a great deal to their ſhooting downward, by means of the ſolidity of the earth, whence the branches advance much faſter and farther in their growth than the roots; and theſe laſt, often finding the reſiſtance of a tough earth unſurmountable, turn their courſe, and ſhoot almoſt horizontally. See the article GENERATION.

VEGETATIVE SOUL, among philoſophers, denotes that principle in plants, by virtue of which they vegetate, or receive nouriſhment and grow. See the preceding article.

VEHICLE, *vehiculum*, in general, denotes any thing that carries or bears another along; but is more particularly uſed in pharmacy for any liquid ſerving to dilute ſome medicine, in order that it may be adminiſtered more commodiouſly to the patient.

VEIL, *velum*, a piece of ſtuff, ſerving to cover or hide any thing.

In the romiſh churches, in time of Lent, they have veils or curtains over the altar, crucifix, images of ſaints, &c.

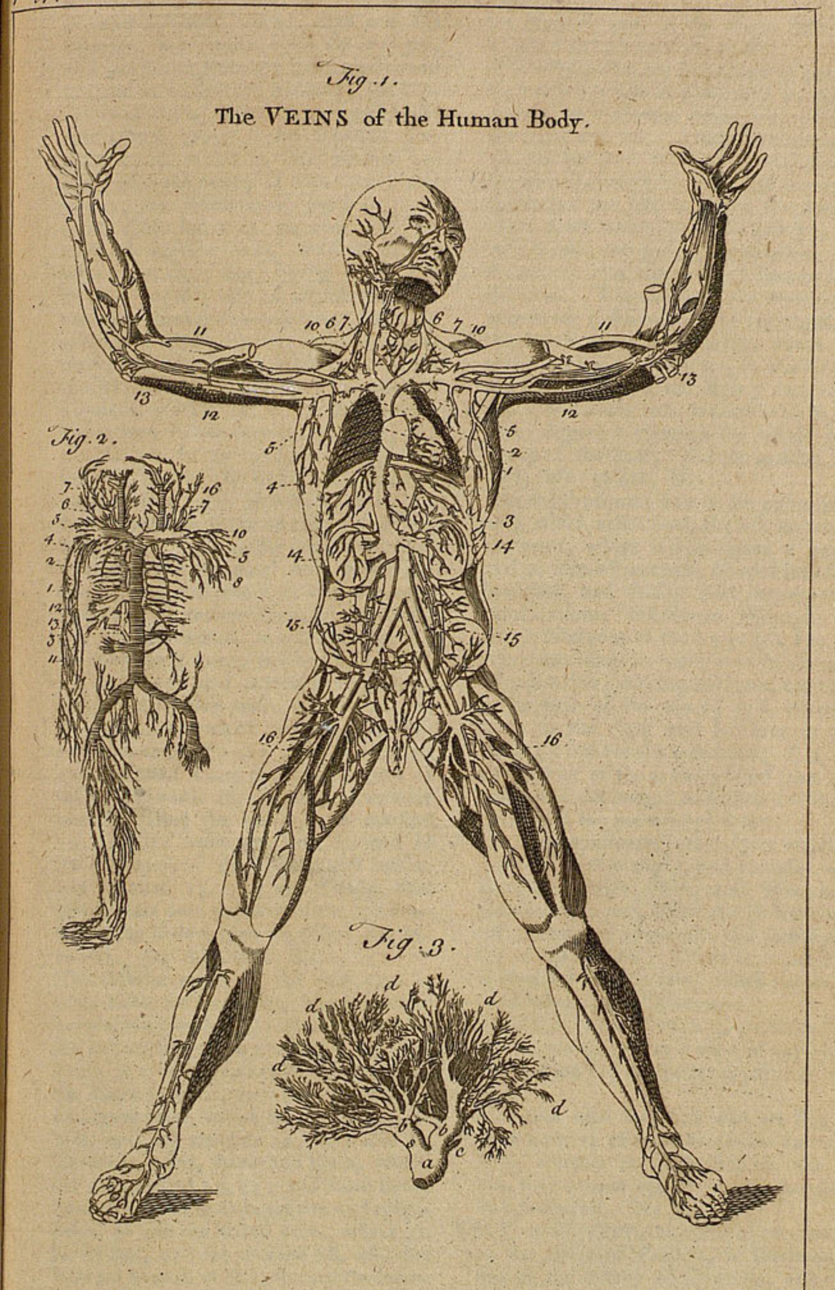
A veil or crape is wore on the head by nuns, as a badge of their profeſſion: the novices wear white veils; but thoſe who have made the vows, black ones. See the article NUN.

VEIN, *vena*, in anatomy, is a veſſel which carries the blood from the ſeveral parts of the body to the heart. The veins are compoſed principally of a membranaceous, a vaſculous, and a muſculous tunic: but theſe are vaſtly thinner than in the arteries. See ARTERY.

The veins are only a continuation of the extreme capillary arteries, reflected back again towards the heart, and uniting their channels as they approach it, till at laſt they all form three large and primary veins, *viz.* the cava, which brings the blood back from all parts above and below the heart; the vena portæ, which brings the blood from the liver; and the pulmonary vein. See CAVA, &c.

The beſt method of tracing the general courſe of the veins, is to begin with the main trunks, or primary veins, and end with their ramifications and capillary extremities, according to their ſeveral diviſions and ſubdiviſions.

The vena cava ariſes, with a large ſinus, from the right auricle of the heart; ſee plate CCXCIII, fig. 1. and 2. where it is marked 1: and here it ſends out a vein to the heart itſelf, called the coronary vein; and is divided into two trunks, a ſuperior, called the cava deſcendens, and marked 2; and an inferior one, called cava aſcendens, and marked 3. From the ſuperior trunk of the vena cava, ariſe the following veins, *viz.* the vena azygos, marked 4; the bronchial vein, which, in




J. Jefferys sculp

in some subjects, indeed, does not rise separate, but comes from the azygos, and sometimes from the intercostals, and in some is altogether wanting; the mediastinal vein, which accompanies the mediastinal artery; the superior diaphragmatic, which in like manner accompanies the artery of that name; and finally, the subclavians, marked 5, 5. From these last arise, on each side, the external jugular vein, marked 6, 6, where the right one, in fig. 1. is cut off: the jugular vein in its sub-divisions receives different denominations from the parts over which they are distributed; as the frontal, temporal, occipital, &c. From the subclavians likewise arise the internal jugulars, marked 7, 7: these give ramifications to the larynx, pharynx, the muscles of the os hyoides, and to the tongue: and besides these, its trunk terminates in a sack, and brings back the blood from the brain and sinuses of the dura mater. From the same veins likewise arise the vertebral one, which ascends to the cranium thro' the transverse apophyses of the vertebræ of the neck; also the intercostals, marked 8 (fig. 2.) the mammary veins, marked 9, 9, *ibid.* the scapulares and musculares: and, finally, the axillary veins, marked 10, 10, the exterior branch of which is called the cephalic, marked 11, 11, (fig. 1. and 2.) and extended along the exterior part of the arm towards the thumb; its interior branch, called the basilic, and marked 12, 12; the vena mediana, formed of the concourse of the hepatic and basilic, and marked 13, 13; and finally, that which runs over the back of the hand towards the little finger, is called the salvatella. See Azygos, &c.

The inferior trunk of the vena cava is remarkable for its valves, which serve to prevent the blood from returning towards the extremities: it is marked 3.

From it arise the following veins; *viz.* the diaphragmatic, hepatic, and renal or emulgent veins, which last go to the kidnies, and are marked 14, 14; also the spermatic veins, sacra and iliacs, which last are marked 15, 15; and from these, on each side, arise hypogastrics and epigastrics, as also the crural veins, which go to the feet, and are marked 16, 16; the internal branch of this, toward the internal malleolus, is called the saphœna; and its external branch about the knee, the poplitæa; in the leg it is called suralis; and about the great toe of each foot, the cephalic vein of the foot. See the article Diaphragmatic, &c.

The vena portæ has some kind of resemblance to a tree in its structure: its roots, or inferior branches, being divided into the right and left. From the right arise all the meseraic veins of the intestines, the internal hæmorrhoidal, and the right epiploics: the left is called the splenic vein; from which arise the gastrics, the vasa brevia, the pancreatic epiploic, and sometimes also the internal hæmorrhoidal vein. The trunk of the vena portæ affords the cystic veins, the right gastric, duodenal, &c. And lastly, where the trunk begins to explicate, it constitutes the sinus portæ in the liver; and from this it is divided into innumerable branches, dispersed through the whole substance of the liver. See the articles Liver, Meseraic, &c.

The third primary vein is the pulmonary one, which arises from the left auricle of the heart, where it first forms a sinus; and is, soon afterwards, divided into four branches, and finally into innumerable ramifications, distributed through the whole substance of the lungs (*ib.* fig. 3.) represents the pulmonary vein in the time of expiration; *a* being its trunk, cut close to the base of the heart; *b*, *b*, its divisions to the right and left lobe of the lungs; *c* the canalis arteriosus; *d*, *d*, the extremities of the arteries freed from the vesicles of the lungs, and their inosculations with the pulmonary veins.

Vein, among miners, is that space which is bounded with woughs, and contains ore, spar, canck, clay, chirt, croil, brownhen, pitcher-chirt, cur, which the philosophers call the mother of metals, and sometimes soil of all colours. When it bears ore, it is called a quick vein; when no ore, a dead vein. See Tracing.

VEJOURS, *visores*, in law, are those sent by the court, to take a view of any place in question for the better decision of the right.

It is also used for those who are sent to view such as essoign themselves de malo lecti, whether in truth they be such as that they cannot appear, or whether they be counterfeit. See Essoin.

VEIT, or *St.* Veit, the name of two towns in the circle of Austria, in Germany; one in the dutchy of Carniola, and the other in that of Carinthia.

VELA, a remarkable cape on the coast of Terra Firma, in west long. 73° 30′, and north lat. 12°.

VELA.

VELAMENTUM-BOMBYCINUM, a name which ſome anatomiſts give to the velvet membrane, or inner ſkin of the inteſtines. See INTESTINES.

VELARIUS, in antiquity, an officer in the court of the Roman emperors, being a kind of uſher, whoſe poſt was behind the curtain in the prince's apartments; as that of the chancellors was at the entry of the baluſtrade, and that of the oſtiarii at the door. The velarii had a ſuperior of the ſame denomination who commanded them.

VELAY, the north-eaſt diviſion of Languedoc, in France.

VELITES, in the Roman army, a kind of antient ſoldiery, who were armed lightly with a javelin, a caſk, cuiraſſe and ſhield.

VELLEITY, *velleitas*, in the ſchool-philoſophy, is uſually defined a languid, cold, and remiſs will. Others ſay, it implies an impotency of obtaining what we require. Others will have it a ſlight deſire for ſomething which a perſon does not matter much, or is too indolent to ſeek. See the article WILL, *&c.*

VELDENTS, a town in the circle of the Lower Rhine, in Germany, ſituated on the eaſt ſide of the river Moſelle, fifteen miles eaſt of Triers.

VELEZ, a town of New Caſtile, fifty miles ſouth-eaſt of Madrid.

VELIRA, a town of Sclavonia, ſixty miles north-weſt of Poſega: eaſt long. 17° 31′, north lat. 46° 15′.

VELLA, in botany, a genus of the tetradynamia-ſiliculoſa claſs of plants, with a tetrapetalous cruciform flower: the ſtamina are ſix filaments, about the length of the cup; and the fruit is a globoſe, criſtated, bilocular pod, containing a few roundiſh ſeeds.

VELLETRI, a town of the Campania of Rome, about twenty miles eaſt of that city.

VELLICATION, among phyſicians, the act of twitching. The word is more particularly applied to a ſort of ſudden convulſions that happen to the fibres of the muſcles.

VELOCITY, ſwiftneſs, or that affection of motion whereby a moving body is diſpoſed to run over a certain ſpace in a certain time. See MOTION.

For the velocity of falling bodies, ſee the article ACCELERATION.

In the doctrine of fluxions it is uſual to conſider the velocity with which magnitudes flow, or are generated. Thus, the velocity with which a line flows, is the ſame as that of the point, which is ſuppoſed to deſcribe or generate the line. The velocity with which a ſurface flows, is the ſame as the velocity of a given right line, that, by moving parallel to itſelf, is ſuppoſed to generate a rectangle, always equal to the ſurface. The velocity with which a ſolid flows, may be meaſured by the velocity of a given plain ſurface that, by moving parallel to itſelf, is ſuppoſed to generate an erect priſm, or cylinder, always equal to the ſolid. The velocity with which an angle flows, is meaſured by the velocity of a point, ſuppoſed to deſcribe the arc of a given circle, which ſubtends the angle, and meaſures it. All theſe velocities are meaſured at any term of the time of the motion, by the ſpaces which would be deſcribed in a given time, by theſe points, lines, or ſurfaces, with their motions continued uniformly from that term.

The velocity with which a quantity flows, at any term of the time, while it is ſuppoſed to be generated, is called its fluxion. See the article FLUXION.

VELOM, a kind of parchment, finer, evener, and whiter than the common ſort. See the article PARCHMENT.

VELVET, a rich kind of ſtuff, all ſilk, covered on the outſide with a cloſe, ſhort, fine, ſoft ſhag, the other ſide being a very ſtrong cloſe tiſſue.

The nap or ſhag, called alſo the velveting, of this ſtuff, is formed of part of the threads of the warp, which the workman puts on a long narrow-channeled ruler or needle, which he afterwards cuts, by drawing a ſharp ſteel tool along the channel of the needle to the ends of the warp. The principal and beſt manufactories of velvet are in France and Italy, particularly in Venice, Milan, Florence, Genoa, and Lucca: there are others in Holland, ſet up by the french refugees; whereof that at Harlem is the moſt conſiderable: but they all come ſhort of the beauty of thoſe in France, and, accordingly, are ſold for 10 or 15 *per cent.* leſs. There are even ſome brought from China, but they are the worſt of all.

There are velvets of various kinds; as plain, that is, uniform and ſmooth, without either figures or ſtripes.

Figured velvet, that is, adorned and worked with divers figures, though the ground be the ſame with the figures; that is, the whole ſurface velveted.

Ramage or branched velvet, repreſenting

long

long ſtalks, branches, &c. on a ſattin ground, which is ſometimes of the ſame colour with the velvet, but more uſually of a different one. Sometimes, inſtead of ſattin, they make the ground of gold and ſilver; whence the denominations of velvets with gold ground, &c.

Shorn velvet, is that wherein the threads, that make the velveting, have been ranged in the channeled ruler, but not cut there.

Striped velvet, is that wherein there are ſtripes of divers colours running along the warp, whether theſe ſtripes be partly velvet, and partly ſattin, or all velveted.

Cut velvet, is that whereon the ground is a kind of taffety, or gros de tours, and the figures velvet.

Velvets are likewiſe diſtinguiſhed, with regard to their different degrees of ſtrength and goodneſs, into velvets of four threads, three threads, two threads, and a thread and a half: the firſt are thoſe where there are eight threads of ſhag, or velveting, to each tooth of the reed; and the ſecond have only ſix, and the reſt four.

In general, all velvets, both worked and cut, ſhorn and flowered, are to have their warp and ſhag of organiſm, ſpun and twiſted, or thrown in the mill; and their woof of ſilk well boiled, &c. They are all of the ſame breadth.

VENA, VEIN, in anatomy. See VEIN.

VENAFRO, a town of Italy, twenty-five miles north of Naples.

VENAISSIN, the territory whereof Avignon is the capital. See AVIGNON.

VENAL, or VENOUS, among anatomiſts, &c. ſomething that bears a relation to the veins. See the article VEIN.

This word is alſo uſed for ſomething bought with money, or procured by bribes.

VENANT, or *St.* VENANT, a town of Artois, twenty miles weſt of Liſle.

VENCE, a town of Provence, in France, ſituated on the confines of Piedmont, ten miles weſt of Nice.

VENDEE, in law, ſignifies the perſon to whom a thing is ſold; in oppoſition to vendor, or ſeller.

VENDITIONI EXPONAS, in law, a judicial writ directed to the ſheriff, commanding him to ſell goods, which he had formerly, by command, taken into his hands, for the ſatisfying a judgment given in the king's court.

VENDOSME, a town of Orleanois, in France, ſituated on the river Loire, thirty-ſeven miles weſt of Orleans.

VENEERING, VANEERING, or FINEERING, a kind of marquetry, or inlaying, whereby ſeveral thin ſlices or leaves of fine woods, of different kinds, are applied and faſtened on a ground of ſome common wood. See MARQUETRY.

There are two kinds of inlaying; the one, which is the moſt common and more ordinary, goes no farther than the making of compartments of different woods; the other requires much more art, in repreſenting flowers, birds, and the like figures.

The firſt kind is properly called veneering; the latter is more properly called marquetry.

The wood uſed in veneering is firſt ſawed out into ſlices or leaves about a line in thickneſs; *i. e.* the twelfth part of an inch. In order to ſaw them, the blocks or planks are placed upright, in a kind of ſawing-preſs. See SAWING-MILL.

Theſe ſlices are afterwards cut into narrow ſlips, and faſhioned divers ways, according to the deſign propoſed; then the joints having been exactly and nicely adjuſted, and the pieces brought down to their proper thickneſs, with ſeveral planes for the purpoſe, they are glued down on a ground or block, with good ſtrong engliſh glue.

The pieces being thus jointed and glued, the work, if ſmall, is put in a preſs; if large, 'tis laid on a bench covered with a board, and preſſed down with poles or pieces of wood, one end of which reaches to the ceiling of the room, and the other bears on the board.

When the glue is thoroughly dry, it is taken out of the preſs and finiſhed; firſt with little planes, then with divers ſcrapers, ſome of which reſemble raſps, which take off the dents, &c. left by the planes.

After it has been ſufficiently ſcraped, they poliſh it with the ſkin of a ſea-dog, wax and a bruſh, or poliſher of ſhave-graſs; which is the laſt operation.

VENEREAL, ſomething belonging to venery; as the lues venerea, french diſeaſe, or pox. See POX, GONORRHOEA, &c.

VENERIS OESTRUM, the ſtimulus or incentive of venery, is an appellation given by ſome anatomiſts to the clitoris.

VENERIS OESTRUM is alſo uſed by others for the tranſport of love, or the utmoſt extacy of deſire, or enjoyment, in coition.

VENERY, is uſed for the act of copulation, or coition, of the two ſexes. See the article GENERATION.

VENERY alfo denotes the act or exercife of hunting wild beafts, which are alfo called beafts of venery, and beafts of the foreft. See the article GAME.

VENESECTION, or PHLEBOTOMY, in furgery. See the article PHLEBOTOMY.

VENETA *bolus*, the *Venetian bole*, a fine red earth ufed in painting, and called in the colour-fhops venetian red. It is improperly denominated a bole, being a genuine fpecies of red ochre. It is of a fine bright, and not very deep red, approaching, in fome degree, to the colour of minium, or red-lead, and is moderately heavy, and of an even and fmooth texture, yet very friable, and of a dufty furface: it adheres firmly to the tongue, is very fmooth, and foft to the touch, eafily crumbles to pieces between the fingers, and very much ftains the fkin in handling. It has a flight aftringent tafte, and makes no fermentation with acids. It is dug in Carinthia, and fent from Venice to all parts of the world, being an excellent colour, and very cheap; our colour-men however find many ways of adulterating it.

VENEZUELA, a province of Terra Firma, lying on the northern ocean, and having new Andalufia on the eaft, new Granada on the fouth, and the river De la Hacha on the weft.

VENIAL, in the Romifh theology, a term applied to flight fins, and fuch as eafily obtain pardon. In confeffing to the priefts, people are not obliged to accufe themfelves of all their venial fins. The thing that gives the greateft embarras to the Romifh cafuifts, is to diftinguifh between venial and mortal fins. The reformed reject this diftinction of venial and mortal fins, and maintain, that all fins, how grievous foever, are venial, and all fins, how flight foever, are mortal. And the reafon they urge is, that all fins, though of their own nature mortal, yet become venial or pardonable, by virtue of our Saviour's paffion, to all fuch as fulfil the conditions on which it is offered in the gofpel.

VENICE, the capital of a republic in Italy, of the fame name, is fituated in the Lagunes, or fmall iflands, of the gulph of Venice, about five miles from the continent: eaft longit. 13°, and north lat. 45° 40′.

Venice is fo happily fituated, that no army can approach it by land; the avenues to thofe iflands being fo exceeding difficult, that they have not thought it neceffary to inclofe the city with a wall. Nothing can appear more beautiful than this city, as we approach it either from the continent or the fea, with its numerous palaces and lofty towers: its circumference is about fix miles, and its inhabitants are computed at two hundred thoufand.

VENIRE FACIAS, in law, is a judicial writ lying where two parties plead and come to iffue; directed to the fheriff, to caufe twelve men, of the fame neighbourhood, to meet, and try the fame, and to fay the truth upon the iffue taken.

VENLO, a town of dutch Gelderland, fituated on the river Maes, nine miles fouth of Gelder.

VENOSA, a town of Italy, eighty miles eaft of Naples.

VENT, VENT-HOLE, or SPIRACLE, a little aperture left in the tubes or pipes of fountains, to facilitate the air's efcape; or, on occafion, to give them air, as in frofty weather, &c. for want of which they are apt to burft. See PIPE.

Vent is likewife applied to the covers of wind-furnaces, whereby the air enters, which ferves them for bellows, and which are ftopped with regifters or fluices, according to the degree of heat required, as in the furnaces of glafs-houfes, affayers, &c.

VENTA DE CRUZ, a town of Terra Firma, forty miles fouth of Porto Bello.

VENTER, BELLY, in anatomy, a cavity in the body of an animal, containing vifcera, or other organs neceffary for the performance of divers functions.

Phyficians divide the human body into three venters, regions, or cavities; the firft, the head, containing the brain, &c. See the article SKULL, &c.

The fecond, the breaft, or thorax, as far as the diaphragm, containing the organs of refpiration. See THORAX.

The third, which is what we call the venter, or belly, is that wherein the inteftines and organs of generation and digeftion are contained; called, by anatomifts, the abdomen. See ABDOMEN.

VENTER is alfo ufed in fpeaking of a partition of the effects of a father and mother, among children born, or accruing from different marriages.

VENTER is alfo ufed for the children whereof a woman is delivered at one pregnancy: thus, two twins are faid to be of the fame venter.

VENTER, or BELLY *of a mufcle*, is the flefhy or belly-part thereof, as contradiftin-

diſtinguiſhed from the two tendons, its extremes, one whereof is called the head, and the other the tail, of the muſcle. See the article MUSCLE.

VENTER DRACONIS, DRAGON'S BELLY, in aſtronomy, denotes the middle of a planet's orbit, or that part moſt remote from the nodes, *i. e.* from the dragon's head and tail; being the part which has the greateſt latitude, or is at the greateſt diſtance from the ecliptic.

VENTIDUCTS, in building, are ſpiracles or ſubterraneous places, where freſh, cool wind being kept, they are made to communicate, by means of tubes, funnels, or vaults, with the chambers or other apartments of a houſe, to cool them in ſultry weather.

VENTILATOR, a machine by which the noxious air of any cloſe place, as an hoſpital, gaol, ſhip, chamber, &c. may be changed for freſh air. The noxious qualities of bad air have been long known, though not ſufficiently attended to, in practice; but it is to be hoped, that the indefatigable pains taken by Dr. Hales, to ſet the miſchiefs ariſing from foul air in a juſt light, and the remedy he has propoſed by the uſe of his ventilators, will at length prevail over that unaccountable ſloth or obſtinacy, which, where particular intereſts are not concerned, ſeems to poſſeſs the generality of mankind, and which rarely allows them to give due attention to any new diſcovery. The ventilators invented by that ingenious gentleman, conſiſt of a ſquare box, ABCD (plate CCXCIV. fig. 1.) about ten feet long, five wide, and two deep; in the middle of which is placed a broad partition, or midriff, made to move up and down, from A to C, on hinges at the end E, by means of an iron-rod ZR, fixed to the midriff at Z. Another box, of the ſame ſize with the former, having a like midriff, bar, &c. is placed near the former, *ibid.* fig. 2. with its rod RZ. Both theſe rods are fixed to a lever FG, moveable on the center O; ſo that by the alternate riſing and depreſſing of the lever FG, the midriffs are alſo raiſed and depreſſed alternately, by which means theſe double bellows are at the ſame time both drawing and pouring out the air. That the midriffs may be rendered lighter, they may be made of four bars lengthwiſe and as many placed croſs them, each about three inches broad, and an inch thick, the vacant ſpaces being filled up with thin pannels of fir board. In order to make the midriffs move with greater eaſe, and without touching the ſides of the boxes, there is an iron-regulator NL, fig. 1. fixed upright to the middle of the end AC of the box. As very little air will eſcape if the edges of the midriff be within one twentieth part of an inch from the ſides of the box, there is no neceſſity for leathern ſides, as in common bellows. The end AC of the box muſt be ſomewhat circular, that it may be the better adapted to the riſing and falling of the midriff; and at the other end of the midriff a ſlip of leather may be nailed over the hinges.

To the ventilators above deſcribed, eight valves are adapted for the air to paſs through; theſe valves are placed at the hinge-end BQ, fig. 2. numbered 1, 2, 3, 4, &c. The valve 1 opens inward, to admit the air to enter, when the midriff is depreſſed at the other end, by means of the lever FG; and at the ſame time the valve 3, in the lower ventilator, is ſhut by the compreſſed air, which paſſes out at the valve 4: but when that midriff is raiſed, the valve 1 ſhuts, and the air paſſes out at the valve 2. The ſame is to be obſerved of the valves 5, 6, 7, 8, of the other box; ſo that when by the motion of the lever FG, the midriffs are alternately riſing and falling, then two of the ventilators are conſtantly drawing in the air, and two of them at the ſame time are blowing it out at their proper valves, the air entering at the valves 1, 3, 6, 8, and paſſing out at the valves 2, 4, 5, 7. To the ventilators, before the valves, is fixed a book QQMM, fig. 3. as a common receptacle for all the air that comes out of theſe valves, which air is conveyed away through the trunk P, paſſing through the wall of a building, &c.

From the foregoing explanation, the nature of ventilators may be eaſily underſtood, and therefore we ſhall be briefer in the following deſcription of thoſe lately erected in Newgate, for exhauſting that priſon of its foul air. In this priſon then there are ſeven ventilators, each nine feet long, and four feet and a half wide; two pair of which are laid on each other: theſe ventilators are worked by means of a wind-mill. The valves of the ventilators open into a large wooden box AB, fig. 4. which is faſtened to the ventilators by the hooks AA: this box is divided into three ſpaces; the middle, or largeſt, CC, receives all the foul air diſcharged

charged by the ventilators, whence it paſſes through a trunk D D, ſixteen inches wide, through the leads into the open air. The outer ſpaces B B B B, receive the foul air through the trunks F F, from the ſeveral wards, from whence it is conveyed into the ventilators, through thoſe valves which open inward, and then diſcharged by the other valves of the ventilators, into the middle partition of the box, and from thence conveyed, by the pipe D D, into the open air. Theſe ventilators are fixed in an upper room of Newgate, in order to be near the leads, where the wind-mill, which works them, is erected; and from each of the outer noſtrils F F, there are trunks, with ſliding ſhutters, paſſing into the ſeveral wards; ſo that by opening theſe trunks, any of the wards may be ventilated, either ſingly, or ſeveral at a time. That the midriffs may not be ſpoiled for want of air, when all the trunks are ſhut, there are two holes cut in the outer noſtrils, at E E, which are covered with boxes twenty inches long, and fourteen wide. In the bottom of each of theſe boxes is a large moveable valve, of ſuch a weight as not to open but when all the other paſſages for the air are ſtopped: by means of theſe valves the ventilators are ſupplied with air, when all the trunks, going into the ſeveral wards, are cloſed, and the midriffs are not in danger of breaking for want of it.

The wind-mill, fig. 5. erected for working the ventilators, is deſigned to move with a ſmall degree of wind, that the ventilators may be the oftener worked. The mill poſt is fixed on four croſs-trees, and ſupported by the braces *u w x y*. This poſt is hollow, that the iron-rod *a*, may paſs through, the lower end of it being fixed to the lever of the ventilators. The upper end of this rod goes to the iron-axle-tree, which has a crank ſix inches long, and therefore gives a ſtroke of thirteen inches; and the other end being fixed to the lever, at a proper diſtance from the center of its motion, raiſes the midriffs fifteen inches. The iron-axle-tree extends about two feet beyond the face of the ſails, from the extremity of which, *p*, eight iron-braces go to the vanes *m*, *n*, *o*, *p*, *q*, *r*, *s*, *&c.* The frame turns on the poſt, on friction-wheels, ſo that the ſails always face the wind, by means of the vane *i*; *l* is the break-pole, which, by pulling the rope *k*, ſtops the mill: *b*, *d*, *c*, *e*, are iron-braces, faſtened at each end with iron-bolts, to keep the frame from wracking. See the article WIND-MILL.

Fig. 6. repreſents an inſtrument invented for going with ſafety into damps, and other noxious air. X Z repreſents a ſquare piece of elder, or willow, a foot long, and two inches both in breadth and depth, with a hole, K L Q U, five eighths of an inch diameter, bored through it; and, at C D, ſhort foſſets, with like holes bored through them; to which foſſets hollow reed-canes are to be fixed by means of ſhort ſupple leathern pipes, ſo as to be flexible at theſe joints. N, T, S, are ſquare holes, two inches deep, and an inch and three quarters wide, with their leathern covers F G, H I, nailed over them. I N is a broad leathern valve, moving on joints at I, ſo as to open, by the force of the air, which paſſes down the pipe B K L, when the breath is drawn in at the mouth at the middle foſſet, which ſtands five eighths of an inch above G H. G S is another like valve, which ſhuts the hole, at Q, cloſe, while the breath is drawing in, through the middle foſſet; but when, on the contrary, the perſon breathes out through the middle foſſet, the valve I N cloſes the hole L, and the other valve G S opens for the breath to paſs freely off through the pipe U A; by which means the perſon always draws in freſh air. There are two ſtiff wires as T, fixed to prevent the valves opening too far, left the force of the breath, which is but ſmall, ſhould not ſhut them. This inſtrument is to be fixed to the mouth by a tape, or cord, tied round the head; and it will be convenient to have cuſhions at the corners C and D, for the cheeks to bear off a part of the preſſure. By the help of this inſtrument a perſon may go into a ſuffocating air, as in ſome mines, *&c.* his noſtrils being ſtopped with cotton, without any danger of ſuffocation.

VENTIMIGLIA, a port-town of Italy, belonging to the Genoeſe, ſituated on the Mediterranean, 100 miles ſouth-weſt of Genoa: eaſt lon. 7° 30′, north lat. 43° 45′.

VENTRICLE, *ventriculus*, properly denotes any little cavity; but is more particularly uſed, by phyſicians and anatomiſts, for the ſtomach. See STOMACH. For thoſe cavities of the heart and brain, called ventricles, ſee HEART and BRAIN.

VENTRILOQUOUS, an appellation given to the engaſtrimythi. See the article ENGASTRIMYTHI.

VENTURINE, or ADVENTURINE, is ſome-

ſometimes uſed for the fineſt and ſlendereſt gold-wire uſed by embroiderers. See the article WIRE.

VENUS, in aſtronomy, one of the inferior planets, revolving round the ſun, in an orbit between that of mercury and the earth. See PLANET, ORBIT, &c.

According to Mr. Caſſini, the greateſt diſtance of venus from the earth is 38415, the mean diſtance 22000, and the leaſt diſtance 5585, ſemi-diameters of the earth. Her diſtance from the ſun is $\frac{723}{1000}$ of the earth's diſtance from the ſun: her excentricity 5; the inclination of her orbit 3° 23′; and her parallax 3′. See the articles DISTANCE, EXCENTRICITY, INCLINATION, and PARALLAX.

The ſemi-diameter of venus is to that of the earth as 10 to 19; her periodical courſe round the ſun is performed in 224 days, 17 hours; and her motion round her own axis in 23 hours. See the articles DIAMETER and PERIOD.

Venus is eaſily diſtinguiſhed by her brightneſs and whiteneſs, which exceeds that of all the other planets, and which is ſo conſiderable, that in a duſky place ſhe pr jects a ſenſible ſhadow. See conſtantly attends the ſun, and never departs from him above 47°. When ſhe goes before the ſun, that is, riſes before him, ſhe is called phoſphorus, or lucifer, or the morning ſtar; and when ſhe follows him, that is, ſets after him, heſperus, or veſper, or the evening ſtar. See the articles PHOSPHORUS, VESPER, &c.

The eye in venus will behold four planets above it, *viz.* our earth, mars, jupiter, and ſaturn; and one below it, which is mercury: and when our earth is in oppoſition to the ſun, it will appear then (in the night) to ſhine with a full orb, and be very bright. The moon will appear always to accompany the earth, and never to be ſeen from her above half a degree. Mercury will never appear to be above 38° diſtant from the ſun.

October 14, 1666, N. S. Caſſini obſerved ſeveral ſpots in the body of this planet, by whoſe motion he judged (though he was not certain) that ſhe moved either by a circulation, or a kind of libration round her axis, in about 23 hours. See the article LIBRATION.

A. D. 1672, and 1686, the ſame aſtronomer, with a teleſcope of 34 feet, believes he ſaw a ſatellite moving round this planet, and diſtant from it about three fifths of venus's diameter. It had the ſame phaſes with venus, but was without any well defined form, and its diameter ſcarce exceeded one fourth of that of venus.

Dr. Gregory thinks it more than probable, that this was a ſatellite; and ſuppoſes the reaſon why it is not uſually ſeen, to be the unfitneſs of its ſurface to reflect the rays of the ſun's light; as is the caſe of the ſpots in the moon, of which, if the whole diſc of the moon were compoſed, he thinks that the planet could not be ſeen in venus.

Venus, when viewed through a teleſcope, is rarely ſeen to ſhine with a full face, but has phaſes juſt like thoſe of the moon, being now gibbous, now horned, &c. and her illumined part conſtantly turned towards the ſun, *i. e.* looks towards the eaſt, when phoſphorus, and towards the weſt, when heſperus. See PHASES.

M. De la Hire, in 1700, through a teleſcope of 16 feet, diſcovered mountains in venus, which he found to be larger than thoſe in the moon. See MOON.

Sometimes ſhe is ſeen in the diſc of the ſun, in form of a dark round ſpot. See the article TRANSIT.

The phænomena of venus evidently ſhew the falſity of the ptolemaic ſyſtem, for that ſyſtem ſuppoſes that venus's orb incloſes the earth. See the article COPERNICAN SYSTEM.

VENUS, in chemiſtry, the ſame with copper. See the article COPPER.

VERA, a port-town of Spain, in the province of Granada, forty-four miles ſouthweſt of Carthagena.

VERA CRUZ, a port-town of Mexico, with a ſtrong and commodious harbour, ſituated on the gulph of Mexico, in weſt long. 100°, north lat. 18° 30′.

VERA PAZ, or COBAN, the capital of a province of the ſame name, in Mexico: weſt long. 93°, and north lat. 15° 6′.

VERAGUA, a province of Mexico, ſituated on the South ſea, weſtward of the gulph of Panama.

VERATRUM, the WHITE HELLEBORE, in botany, a genus of the polygamia-monoecia claſs of plants, the hermaphrodite corolla whereof conſiſts of ſix oblong, lanceolated, ſerrated petals; the male corolla is divided into ſix parts; the fruit conſiſts of three oblong, erect, compreſſed capſules, made up of one valve, and containing only one cell; the ſeeds are numerous, compreſſed, and truncated, and more obtuſe upon one extremity. For the virtues of this plant, ſee the article *White* HELLEBORE.

VERB, in grammar, a word ferving to exprefs what we affirm of any fubject, or attribute to it; or, according to others, it is a word principally ufed to fignify the affirmation, and fhews that the difcourfe, wherein it is ufed, is that of a man, who not only has a conception of things, but judges or affirms fomething of them: though it is principally ufed in this fenfe, yet it is made ufe of alfo to fignify other motions of the foul, as to defire, to pray, to command; but this it only does by changing the mood or inflexion. The verb, in its primary fignification, fhould have no other ufe, but to mark the connexion which we make in the mind, between the two terms cf a propofition: but the *effe*, *to be*, is the only one that has retained this fimplicity; nor, in ftrictnefs, has this retained it, but in the third perfon, as *eft*, *is*. Men being naturally inclined to fhorten their expreffions, to the affirmation they have almoft always added other fignifications, in the fame word, fo as that two words make a propofition; as in *Petrus vivit*, *Peter lives*; where *vivit* includes both the attribute and affirmation; it being the fame thing to fay, *Peter lives*, as that *Peter is living*; and hence the great variety of verbs in every language. To confider fimply what is effential to a verb, the only true definition is, a word fignifying an affirmation; but if we fhould chufe to add its principal accidents, it may be defined thus; a word which fignifies affirmation, with the defignation of perfon, number, and time. Verbs are varioufly divided: with refpect to the fubject, they are divided into active, paffive, neuter, &c. with refpect to their inflexions, into regular, irregular, perfonal, imperfonal, auxiliary, fubftantive, &c. A verb active is a verb which expreffes an action that falls on another fubject or object; fuch are *I love*, *I work*, &c. which fignify the action of loving, working, &c. of thefe there are three kinds; the one called tranfitive, where the action paffes to a fubject different from the agent; reflected, where the action returns upon the agent; and reciprocal, where the action returns mutually upon the two agents that produced it. A verb paffive is that which expreffes a paffion, or which receives the action of fome agent; and which is conjugated in the modern tongues, with the auxiliary verb *I am*, *je fuis*. A verb neuter, is that which fignifies an action that has no particular object whereon to fall, but which of itfelf takes up the whole idea of the action, as *I fleep*, *thou yawneft*, *he fnores*, *we walk*, *you run*, *they ftand*: the Latins called them neuters, becaufe they are neither active, nor paffive, though they have the force and fignification of both. Of thefe verbs fome form their tenfes by the auxiliary verb *to have*, as *I have flept*, *you have run*; and they are called neuter actives. There are others which form their compound parts by the auxiliary *to be*, as *I am come*; thefe are called neuters paffive. A verb fubftantive is that which expreffes the being or exiftence of a thing, as *I am*, *thou art*. Auxiliary or helping verbs, are thofe which ferve in conjugating active and paffive verbs, fuch are *I am*, *I have*, &c. Verbs in englifh, and moft modern tongues, do not change their terminations, as in latin, to exprefs the feveral times, modes, &c. but they make ufe of auxiliaries, as *have*, *am*, *be*, *do*, *will*, *fhall*, &c. Regular verbs are thofe which are conjugated after fome one manner, rule, or analogy. Irregular or anomalous verbs, are fuch as have fomething fingular in the terminations or formations of their tenfes. Verbs imperfonal are thofe which have only the third perfon, as *it behoves*, &c. See IMPERSONAL, &c.

VERBAL, fomething that belongs to verbs, or even to words of any kind fpoken with the mouth. See VERB and WORD.

Thus, verbal nouns, among grammarians, are thofe formed of verbs. See NOUN. Again, a verbal contract is one made merely by word of mouth in oppofition to that made in writing. See the articles CONTRACT and DEED.

VERBASCUM, MULLEIN, in botany, a genus of the pentandria-monogynia clafs of plants, the flower of which is monopetalous, with a fhort cylindraceous tube, and a quinquepartite and rotated limb: the fruit is a roundifh and bilocular capfule, containing numerous angulated feeds.

Mullein-leaves are recommended as emollient, and efteemed, by the Italians, in confumptions: its flowers have an agreeable honey-like fweetnefs; and an extract prepared from them, by rectified fpirit of wine, taftes extremely pleafant.

VERBENA, VERVAIN, in botany, a genus of the diandria-monoecia clafs of plants, with a monopetalous flower, femiquinquifid at the limb; the feeds are two or four, and contained in the cup.

Vervain is quite difregarded in the prefent

fent practice, as appearing almoft fimply herbaceous.

VERBERATION, *fmiting*, in phyfics, a term ufed to exprefs the caufe of found, which arifes from a verberation of the air, when ftruck in divers manners by the feveral parts of the fonorous body firft put into a vibratory motion.

VERBESINA, in botany, a genus of the fyngenefia-polygamia fuperflua clafs of plants, with a radiated flower, made up of hermaphrodite tubulofe ones on the difc, and a few ligulated ones on the verge; the feeds are angulated, and contained in the cup.

VERCELLI, a city of Piedmont, in Italy, forty-five miles north-eaft of Turin.

VERD, or CAPE-VERD, a promontory of Africa, forty miles north-weft of the mouth of the river Gambia: weft long. 18°, north lat. 15°.

There are a number of iflands in the Atlantic ocean, called Cape-Verd-iflands, from their being fituated off this cape.

VERDEGREASE, or VERDEGRIS, a kind of ruft of copper, much ufed by painters as a green colour.

Verdegreafe is properly no other than copper, diffolved by a mild acid into the form of an ærugo, or ruft. After preffing the grapes for wine, the hufks, ftones, and other refufe are laid to be dried in the fun; they are then moiftened with the ftrongeft wine that can be had, and laid together in veffels till they begin to ferment; after nine or ten days the matter is preffed, and worked into balls between the hands, and laid in an orderly manner over the bottom of an earthen veffel, and as much wine is laid over them as will cover them half way up. The veffels are then covered with a loofe lid, and fet in a cellar where the balls are left in the wine about fifteen hours, a perfon turning them four or five times in that fpace, in order to make the wine foak perfectly through them; after this, fome wooden bars are placed acrofs the veffel, about half an inch above the furface of the wine, and the balls are laid out of the wine upon thefe; the veffels are then fhut up, and the whole left in this ftate for ten days or more: at the end of this time the balls emit a very penetrating fcent, and are fit for diffolving copper. They are now to be broke to pieces, and the outfide mixed with the internal part, which is moifter; they are then laid with thin plates of copper, ftratum fuper ftratum, in the fame veffels upon the bars, and the whole is left for a week or a fortnight, at the end of which time the plates are found covered with verdegreafe, which is not taken off immediately: but they are wrapped up in cloths wetted with wine, and laid by a week or more, and then the ærugo or verdegreafe is taken off for ufe.

This ruft of copper is rarely ufed internally, nor ought it, unlefs in the moft defperate cafes, where an inftantaneous vomiting is neceffary. Externally it is much ufed as a detergent or deficcative: it eats off fungous flefh in ulcers, and, mixed with honey, is ufed in aphthæ and ulcerations of the mouth. It is the bafis of what is called the egyptian ointment, and of many other compofitions in the fame intention. There is a preparation of this ærugo of copper, in fome ufe at prefent both in medicine and in painting, which ought not to be omitted here: it is called, though very imperfectly, diftilled verdegreafe; it is a cryftallization of verdegreafe, prepared thus: bruife to a coarfe powder fome fine green verdegreafe, pour on it diftilled vinegar; to the remainder continue to do this, till the liquor will no longer extract any colour from the mafs. Evaporate or diftil thefe liquors, all mixed together, till a pellicle covers the furface, then fet it in a cellar, and it will fhoot into fine green cryftals. Evaporate the remainder of the liquor, and fet it to fhoot again till no more will be produced. Thefe are the cryftals of verdegreafe, improperly called diftilled verdegreafe. They are better than the crude fubftance, for eating away proud flefh. A folution of them in common water is an excellent detergent for old ulcers; and they are ufed in common eye-waters, to clear away fpecks and films. Thefe cryftals, diftilled in a retort, afford, after an ufelefs phlegm is come over, a noble acid, the richeft that can be procured from vinegar. It is, by the chemical writers, called acetum efuriens; it is greatly celebrated for its virtues as a menftruum, and worthy great praife, tho' not equal to all that is faid of it.

VERDERER, or VERDEROR, a judicial officer of the king's foreft, whofe bufinefs it is to look to the vert, and fee it well maintained. See the article VERT.

VERDICT, is the anfwer of the jury given to the court, concerning the matter of fact,

fact, in any case civil or criminal, committed by the court to their trial and examination. See the article JURY.

A verdict is either general or special. A general verdict is that which is brought into the court in like general terms as the general issue, as, in an action of disseisin, the defendant pleads no wrong, no disseisin. Then the issue is general, whether the fact be wrong or not, which being committed to the jury, they, upon consideration of the evidence, come in and say, either for the plaintiff, that it is a wrong disseisin; or for the defendant, that it is no wrong disseisin.

A special verdict, is, when they say at large, that such and such a thing they found to be done by the defendant or tenant; declaring the course of the fact, as in their opinion it is proved; and praying the judgment of the court, as to what is law in that case.

It is said, that a jury may give a general or special verdict, in all actions, and cases; and that the court is obliged to receive it, provided it be pertinent to the point in issue: also if the jury will take upon them to bring in any thing that is matter of law, their verdict shall be received.

Verdicts are also public and private; public, when the same are given in open court; and private, when given out of court, before any of the judges: but a private verdict, in strictness, is looked upon to be no verdict.

VERDITER, or VERDETER, a kind of mineral substance, sometimes used by the painters, &c. for a blue; but more usually mixed with a yellow for a green colour.

Verditer, according to Savary, ought to be made of the lapis armenus; or at least of an earthy substance much like it, brought from the mountains of Hungary, &c. only prepared by powdering it, and cleansing it by lotion.

But this stone being very rare, the verditer commonly used is not a native, but a factitious, substance; which some say is prepared by casting wine or water upon new copper, as it comes red hot out of the furnace, and catching the steams that rise from it upon copper-plates: others again say, it is prepared by dissolving copper-plates in wine, much after the manner of verdegrease.

But the method of making it in England is as follows:

The refiners pour their copper-water into an hundred pound weight of whiting, stirring them well together every day for some hours, till the water grows pale; then they pour that off, and set it by for further use, and pour on more of the green water, repeating this till the verditer is made; which they then take out, and lay on large pieces of chalk in the sun to dry.

The water which is poured off from the verditer, (which remains at the bottom of the tub) is put into a copper, and boiled till it comes to the consistence of water-gruel; now, consisting principally of salt-petre reduced, most of the spirit of vitriol being gone with the copper into the verditer; and a dish full of this being put into the other materials for aqua-fortis, is re-distilled, and makes what they call a double water, which is near twice as good as that made without it.

VERDOY, in heraldry, denotes a bordure of a coat of arms, charged with any kinds or parts of flowers, fruits, seeds, plants, &c.

VERDUN, a city of Lorrain, situated on the river Maes, forty miles north-west of Nancy.

VERGE, signifies the compass of the king's court, which bounds the jurisdiction of the lord steward of the houshold; and which is thought to have been twelve miles round.

The term verge is also used for a stick or rod, whereby one is admitted tenant to a copyhold estate, by holding it in his hand, and swearing fealty to the lord of the manor.

VERGERS, certain officers of the courts of king's-bench and common-pleas, whose business it is to carry white wands before the judges.

There are also vergers of cathedrals and collegiate churches, who carry a rod tipped with silver before the bishop, dean, &c.

VERGETTE, in heraldry, denotes a pallet, or small pale; and hence, a shield divided by such pallets, is termed vergette. See the article PALE.

VERGILIÆ, in astronomy, a constellation, the appearance of which denotes the approach of spring: it is the same with pleiades. See PLEIADES.

VERIFICATION, in general, is the act of proving a thing; but among the french, it only signifies the recording of the king's edicts by the parliament.

VERJUICE, a liquor obtained from grapes or apples, unfit for wine or cyder; or from

from ſweet ones, whilſt yet acid and unripe. Its chief uſe is in ſauces, ragouts, *&c.* though it is alſo an ingredient in ſome medicinal compoſitions, and is uſed by the wax-chandlers to purify their wax.

VERMICELLI, or VERMICHELLY, a compoſition of flour, cheeſe, yolks of eggs, ſugar, and ſaffron, reduced to a paſte, and formed into long ſlender pieces like worms, by forcing it with a piſton thro' a number of little holes.

It was firſt brought from Italy, where it is in great vogue: it is chiefly uſed in ſoups and pottages, to provoke venery, *&c.*

VERMICULAR, an epithet given to any thing that bears a relation or reſemblance to worms, vermiculi. See WORM.

Anatomiſts particularly apply it to the motion of the inteſtines and certain muſcles of the body.

The vermicular or periſtaltic motion of the inteſtines is performed by the contraction of the fibres thereof, from above downwards; as the antiperiſtaltic motion is by their contraction from below upwards.

VERMIFORMIS, in anatomy, a term applied to various parts in the human body, bearing ſome reſemblance to worms. As ſome muſcles, proceſſes, *&c.*

*Proceſſus*, or *apophyſes* VERMIFORMES, two extremities of the cerebellum, ſituate near the fourth ventricle of the brain. See the article BRAIN.

VERMIFORMES *muſculi*, are the four muſcles in each hand and foot, which bring the fingers and toes towards the thumbs and great toes, called alſo lumbricales. See the article LUMBRICAL.

VERMILION, a very bright and beautiful red colour, in great eſteem among the antients, under the name of minium. There are two kinds of it, the one natural, the other factitious. The natural is found in ſome ſilver mines, in the form of a ruddy ſand, which is afterwards prepared and purified by ſeveral lotions and coctions. The artificial is made of mineral cinnabar, ground up with aqua-vitæ and urine, and afterwards dried.

It is alſo made of lead burnt and waſhed, or of ceruſs prepared by fire: but this is not properly called vermilion, but minium, or red-lead. See MINIUM.

Yet this laſt, however, ſeems to be the real vermilion of the antients; and both apothecaries and painters ſtill give it the name, to enhance the price.

We have two kinds of vermilion from Holland, the one of a deep red, the other pale; but it is the ſame thing at the bottom: the only difference of colour proceeding from the cinnabar's being more or leſs ground: when the cinnabar is finely ground, the vermilion is pale: and this is preferred before that which is coarſer and redder.

It is of very great uſe with painters in oil and miniature; and among the ladies for a fucus, or paint, to heighten the complexion of ſuch as are too pale.

Some diſapprove of vermilion to be uſed in painting prints, unleſs it be prepared by waſhing, as is directed for minium; and then chiefly for dry painting, except it be by thoſe perſons who can uſe it moderately, and with judgment; for all heavy colours will drown the ſhades or ſtrokes of the engraver.

VERMIN, *vermina*, a collective name including all kinds of little animals, or inſects, which are hurtful or troubleſome to men, beaſts, fruits, *&c.* as worms, lice, fleas, caterpillars, ants, flies, *&c.* See the articles WORM, *&c.*

VERMINATION, *verminatio*, the act of breeding worms, and other vermin; particularly bots, in cattle, *&c.*

VERMINATION, is ſometimes alſo uſed, among phyſicians, for a ſort of tormina ventris, or wringing of the guts, wherein the patient is affected, as if worms were gnawing his inteſtines. See GRIPES.

VERMIVOROUS ANIMALS, are ſuch as feed upon worms. See ANIMAL.

VERNACULAR, is applied to any thing that is peculiar to ſome one country.

VERNAL, ſomething belonging to the ſpring ſeaſon. See the article SPRING.

Hence vernal leaves, are thoſe leaves of plants which come up in the ſpring. Vernal ſigns, are thoſe which the ſun is in during the ſpring ſeaſon, *viz.* aries, taurus, and gemini. Vernal equinox, is that which happens when the ſun is aſcending from the equator towards the north pole. See the article LEAF, *&c.*

VERNEVIL, a town of Normandy, forty-three miles ſouth of Rouen.

VERNIER, or NONIUS, among mathematicians, a ſcale of diviſions, ſerving to cut the diviſions of an arch into ſingle minutes.

VERONA, a city of Italy, in the territories of Venice, capital of the Veroneſe, ſituated on the river Adige: eaſt long. 11° 15′, north lat. 45° 20′.

VERONICA, in botany, a genus of the decandria

decandria-monogynia clafs of plants, the corolla whereof confifts of a fingle petal; the tube is nearly of the length of the cup; the limb is plain, and divided into four parts; the fegments are oval, and the lower one is narrower than any of the reft; the fegment over-againft it, is broader than any; the fruit is a capfule of a turbinated cordated figure, with a compreffed apex, it is compofed of four valves, and contains two cells, in each whereof are numerous roundifh feeds.

Among the fpecies of this genus, are the common fpeedwell, the brooklime, and the wild germander. See the article SPEEDWELL, &c.

Thefe and feveral other fpecies of this genus, are famous in medicine; the common fpeedwell is a good antifcorbutic, and has lately been celebrated in the gout and rheumatifm. The water-brooklime is alfo one of the antifcorbutics of the fhops, and its juice is alfo made a part of the fpring juices given againft thofe complaints.

VERSAILLES, a town of France, in the province of the ifle of France, fituated eleven miles weft of Paris, where ftands one of the moft elegant and magnificent palaces in the world, built by Lewis XIV.

VERSE, *verfus*, in poetry, a line or part of a difcourfe, confifting of a number of long and fhort fyllables, which run with an agreeable cadence, the like being alfo reiterated in the courfe of the piece. See the article POEM.

This repetition, according to F. Boffu, is neceffary to diftinguifh the notion of verfe from that of profe; for in profe, as well as verfe, each period and member are parts of difcourfe, confifting of a certain number of long and fhort fyllables; only profe is continually diverfifying its meafures and cadences, and verfe regularly repeating them. This repetition of the poets appears even in the manner of writing; for one verfe being finifhed, they return to the beginning of another line, to write the verfe following, and it is to this return, that verfe owes its name. See the article PROSE.

To make verfe, it is not enough that the meafures and quantities of fyllables be obferved, and fix juft feet put one after another in the fame line. There are further required, certain agreeable cadences, particular tenfes, moods, regimens, and even fometimes words unknown in profe. But what is chiefly required, is an elevated, bold, figurative manner of diction; this manner is a thing fo peculiar to this kind of writing, that without it, the moft exact arrangements of longs and fhorts does not conftitute verfe fo much as a fort of meafured profe. The greek and latin verfes confift of a certain number of feet, difpofed in a certain order; and fome have attempted to make french and englifh verfes on the fame foundation, but without fuccefs. Voffius is very fevere on the modern verfe, and makes it altogether unfit for mufic. Our verfes, fays he, run all as it were upon one foot, without diftinction of members or parts, and without regard to the natural quantities of fyllables. We have no rhythmus at all, and we mind nothing but to have a certain number of fyllables in a verfe of of whatever nature, and in whatever order. Mr. Malcolm vindicates our verfe from this imputation. It is true, fays he, we do not follow the metrical compofition of the antients, yet we have fuch a mixture of ftrong and foft, long and fhort, fyllables, as make our verfes flow fmooth or rumbling, flow or rapid, agreeable to the fubject. Inftances of all which we have in the following lines of Pope.

Thefe equal fyllables alone require,
Tho' oft' the ear the open vowels tire,
While expletives their feeble aid do join,
And ten low words oft creep in one dull line.
Soft is the ftrain when Zephyr gently blows,
And the fmooth ftream in fmoother numbers flows;
But when loud billows lafh the founding fhore,
The hoarfe rough verfe fhould like the torrent roar;
When Ajax ftrives fome rock's vaft weight to throw,
The line too labours, and the words move flow.
Not fo when fwift Camilla fcours the plain,
Flies o'er th' unbending corn, and fkims along the main.

By making a fmall change or tranfpofition of a word in any of thefe verfes, any body who has an ear will find, that we make a great matter of the nature and order of the fyllables. See NUMBERS.

Voffius adds, that the antient odes were fung as to the rhythmus, in the fame manner as we fcan them, every pes being a diftinct bar, or meafure feparated by

by a diſtinct pauſe, though in reading, that diſtinction was not accurately obſerved. Laſtly, he obſerves, that their odes had a regular return of the ſame kind of verſe, and the ſame quantity of ſyllables, in the ſame place of every verſe; whereas, in the modern odes, to follow the natural quantity of our ſyllables, every ſtanza would be a diſtinct ſong. See the article ODE.

Verſes are of various kinds, ſome denominated from the number of feet, whereof they are compoſed, as the monometer, dimeter, trimeter, tetrameter, pentameter, hexameter, *&c.* See the articles HEXAMETER, *&c.*

Some alſo, from the kinds of feet uſed in them, as the pyrrhichion, proceleuſmatic, iambic, trochaic, *&c.* See the article PYRRHICHION, *&c.*

Sometimes verſes are denominated from the names of the inventors, or the authors who have uſed them with moſt ſucceſs, as the anacreontic, archilochian, aſclepia, alcaic, ſapphic, *&c.* See the article ANACREONTIC, *&c.*

The moderns have invented heroic or alexandrine verſes; the antients likewiſe invented various kinds of poetical devices in verſe, as centos, echos, *&c.* See the article ALEXANDRINE, *&c.*

VERSE is alſo uſed for a part of a chapter, ſection, or paragraph, ſubdivided into ſeveral little articles. The whole bible is divided into chapters, and the chapters are ſubdivided into verſes. The diviſion of verſes in the New Teſtament was firſt made by one Robert Stephens, with which diviſion many learned men find great fault, and yet it is every where followed.

VERSED *ſine of an arch*, a ſegment of the diameter of a circle, lying between the foot of a right ſine, and the lower extremity of the arch. See SINE.

VERSIFICATION, the art or manner of making verſe; alſo the tune and cadence of verſe. See the article VERSE.

Verſification is properly applied to what the poet does more by labour, art and rule, than by invention, and the genius or furor poeticus. See POETRY, *&c.*

VERSION, a tranſlation of ſome book or writing, out of one language into another.

VERT, in heraldry, the term for a green colour. It is called vert in the blazon of the coats of all under the degree of nobles; but in coats of nobility, it is called emerald; and in thoſe of kings, venus. In engraving, it is expreſſed by diagonals, or lines drawn athwart from right to left, from the dexter chief corner to the ſiniſter baſe, as repreſented in plate CCXC. fig. 4.

VERT, or GREEN HUE, in foreſt law, any thing that grows and bears a green leaf within the foreſt, that may cover a deer. This is divided into over-vert and nether-vert; over-vert is the great woods which in law-books are uſually called haultbois; neither-vert is the under woods, otherwiſe called ſub-bois. We ſometimes alſo meet with ſpecial vert, which denotes all trees growing in the king's woods within the foreſt; and thoſe which grow in other men's woods, if they be ſuch trees as bear fruit to feed the deer.

VERTEBRÆ, in anatomy, the twenty-four bones of which the ſpine conſiſts, and on which the ſeveral motions of the trunk of our bodies are performed. See the article SPINE.

Each of theſe vertebræ is compoſed of its body and proceſſes. The body is the thick, ſpungy, anterior part, which is convex before, concave backwards, horizontal and plain in moſt of them above and below; their anterior and poſterior ſurfaces having ſeveral holes made in their thin external plate, both for the firmer connexion of the ligaments, and for the paſſage of veſſels into their cellular ſubſtance. Between theſe bodies of each two adjoining vertebræ, a ſubſtance between the nature of ligament and cartilage is interpoſed; which is compoſed of concentrical curve fibres, the exterior of which are the moſt ſolid and hard, while thoſe in the centre are very ſoft and full of a glairy liquor; and therefore this ſubſtance was called by the antients ligamentum mucoſum. This is firmly fixed to the horizontal ſurfaces of the bodies of the vertebræ, and therefore not only allows theſe bones to recede from each other, and to be preſt cloſer together without breaking, but ſerves to connect them, in which it is aſſiſted by a ſtrong membranous ligament, which lines all their concave ſurface, and by ſtill a ſtronger ligament that covers all their anterior convex ſurface. It may be obſerved, as a general rule, notwithſtanding ſome exceptions, that the bodies of the vertebræ are ſmaller and more ſolid above, but as we reckon downwards, appear larger and more ſpungy, and that the cartilages between them are thick, and the ſurround-

ing ligaments ſtrong in proportion to the largeneſs of the vertebræ, and the quantity of motion they are to perform: by which diſpoſition the greater weight is ſupported on the broadeſt beſt ſecured baſe, and the middle of our body is allowed a large and ſecure motion, which is of conſiderable benefit. From each ſide of the body of each vertebra, a bony bridge is produced backwards and to a ſide; from the poſterior extremity of which, one ſlanting proceſs riſes, and another deſcends; the ſmooth, and what is generally the flatteſt ſide of each of theſe four proceſſes, which are called the oblique, is covered with a ſmooth cartilage, and the two inferior oblique proceſſes of each vertebra are fitted to, and articulated with, the two ſuperior or aſcending oblique proceſſes of the vertebra below. From between the ſuperior and inferior oblique proceſs of each ſide, the vertebra is ſtretched out laterally in form of a proceſs, that is univerſally named tranſverſe. From the poſterior roots of the two oblique, and of the tranſverſe proceſs of each ſide, a broad oblique bony plate is extended backwards; where theſe meet, the ſeventh and laſt proceſs of the vertebræ takes its riſe and ſtands out backwards; this being generally ſharp-pointed, and narrow-edged, has therefore been called ſpinal proceſs, from which this whole chain of bones has got the name ſpina. Beſides the common ligament which lines all the interior ſurface of theſe proceſſes as well as of the bodies, there are particular ligaments that connect the proceſſes of each two contiguous vertebræ. The ſubſtance of the proceſſes is conſiderably ſtronger and firmer than that of the bodies of the vertebræ, having a thicker external plate, and without ſo many large holes in it. The ſeven proceſſes conſidered conjunctly, as forming the poſterior ſhares of the vertebræ, are hollow at their anterior middle part; which concavity, joined with that at the poſterior part of the bodies, makes one great foramen, which anſwers to ſuch another in the vertebræ above and below; therefore the foramina of all the vertebræ taken together, form a long great conduit, which is widened or ſtraitened in proportion to the ſize of the medulla ſpinalis, which it contains. See the article MEDULLA.

In the lateral bridges, which join the bodies to the proceſſes of each vertebra, a ſemicircular notch is obſervable both above and below; which, exactly correſponding with others in the contiguous bones, when the vertebræ are joined, form a round hole in each ſide, between each two vertebræ, through which the nerves that proceed from the medulla ſpinalis and the blood veſſels paſs. The articulations then of theſe true vertebræ are plainly double; for their bodies are joined by ſynchondroſis, and their oblique proceſſes are articulated by the third ſort of ginglymus. Hence it is evident, that their centre of motion is altered in different poſitions of the trunk. For when we bow forwards the ſuperior moved part bears entirely on the bodies of the vertebræ; if we bend back, the oblique proceſſes ſupport the weight; if we recline to one ſide, we reſt upon the oblique proceſſes of that ſide and part of the bodies; if we ſtand erect, all the bodies and oblique proceſſes have their ſhare in our ſupport. See ARTICULATION.

There are in all twenty-four vertebræ: the neck conſiſts of ſeven; and in theſe, as in the others, we are to obſerve ſome things in general; and afterwards, other things in particular. The vertebræ of the neck are ſmaller than thoſe of the back; but they are of a firmer conſiſtence, and harder: their body is more compreſſed than in the others, and is ſinuated on the other part, and convex below. Moſt of theſe vertebræ have nine apophyſes; the tranſverſe and poſterior ones, called the ſpinoſe apophyſes, are uſually bifurcated: the tranſverſe ones are perforated alſo, for the paſſage of the vertebral veſſels to the head. In the conſideration of the vertebræ of the neck ſingly, we are to obſerve, that the upper one has a peculiar name: it is called atlas. This wants the body and the ſpinoſe apophyſes, and approaches to the figure of a ring: its ſubſtance is more ſolid than that of any other, and it receives both above and below; but it is not received itſelf. The head is articulated at its interior part, and it is by means of this articulation that the head is bent, and extended. The proper foramen is greater in this than in any other vertebra, which ariſes from its wanting the body: the tranſverſe proceſſes are alſo longer than in the others. It has alſo a peculiar ſemicircular ligament, by which it embraces the dentiform proceſs of the ſucceeding vertebra. The ſecond vertebra is called epiſtrophæus, and axis; in which we are to obſerve the dentiform or odontoide

proceſs,

procefs, juft mentioned; whereby it articulates in the manner of an hinge, with the firft vertebra, and the rotatory motion of the head is performed by means of it. The third vertebra is alfo called axis by fome, though it has nothing to warrant fuch a name; for there is nothing particular to be obferved in this, or any of the fucceeding vertebræ of the neck, more than has been already taken notice of them in general. The dorfum, or back, has twelve vertebræ; of which we may remark in general, that they are of a middle fize between thofe of the neck, and thofe of the loins: their fpinofe apophyfes are alfo very long, and, except in the two laft, very much inclinated: the cartilages between the bodies of thefe, are fmaller than thofe of the neck: the two tranfverfe apophyfes are thick, and have a depreffion in them for the articulation with the ribs. The firft vertebra of the back is called the axillary, or eminent vertebra; and to it is joined the upper rib. See RIBS.

The vertebræ of the loins are five; of which we may obferve in general, that their bodies, and alfo the intervening cartilages, are very thick; the tranfverfe apophyfes very long, but fmaller than thofe of the back; the fpinofe apophyfes are thick, ftraight, and fet farther afunder than in the others, to give way to a laxer motion in this part.

Some have given particular names to the vertebræ of the back and loins; but this is not neceffary, as they are fufficiently diftinguifhed by numbering them. For the luxations, fractures, and other injuries of the vertebræ, fee the articles SPINE, RIBS, LUXATION, &c.

VERTEX, in anatomy, denotes the crown of the head, or the uppermoft part fituated between the finciput and occiput. See the article HEAD.

Hence vertex is alfo ufed, figuratively, for the top of other things: thus, the vertex of a cone, pyramid, &c. is the top of any one of thefe figures. See CONE, &c.

The vertex of an angle is the angular point; and thofe angles, which, being oppofite to one another, do touch only in the angular point, are called vertical angles: fuch are the angles A B C and D B E (plate CCXC. fig. 5.) wherein the fides A B and C B of one of them are only continuations of the legs of the other, B E and B D; and fuch angles are demonftrated to be equal.

The vertex of any plane figure, is the angle oppofite to the bafe; and the vertex of a curve, is the point from which the diameter is drawn, or the interfection of the diameter and curve.

VERTEX *of a glafs*, in optics, the fame with the pole thereof.

VERTEX is alfo ufed, in aftronomy, for the point of heaven perpendicularly over our heads, properly called the zenith. See the article ZENITH.

*Path of the* VERTEX, the circle defcribed by the vertical point during one revolution of the earth about its axis.

VERTICAL CIRCLE, in aftronomy, a great circle of the fphere paffing through the zenith and nadir, and cutting the horizon at right angles: it is otherwife called azimuth. See AZIMUTH.

*Prime* VERTICAL, is that vertical circle or azimuth which paffes through the poles of the meridian; or which is perpendicular to the meridian, and paffes through the equinoctial points. See AZIMUTH.

VERTICAL *of the fun*, is the vertical which paffes through the center of the fun at any moment of time.

VERTICAL PLANE, in perfpective, is a plane perpendicular to the geometrical plane, paffing through the eye, and cutting the perfpective plane at right angles.

VERTICAL PLANE, in conics, is a plane paffing through the vertex of the cone, and parallel to any conic fection. See the article PLANE.

VERTICAL LINE, in conics, is a right line drawn on the vertical plane, and paffing through the vertex of the cones. See the article LINE.

VERTICAL DIAL, is a fun-dial drawn on the plane of a vertical circle, or perpendicular to the horizon. See DIAL.

VERTICAL POINT, in aftronomy, the fame with vertex or zenith.

VERTICILLATE PLANTS, are fuch as have their flowers intermixed with fmall leaves growing in a kind of whirls about the joints of a ftalk; as penny-royal, hore-hound, &c. See PLANT.

The peculiar characteriftic of this genus of plants, according to Mr. Ray, is, that their leaves grow in pairs, one juft againft another, on the ftalk; the flower is monopetalous, but ufually grows down with a kind of lip, or turning, fomething like the form of a helmet; there are four feeds after each flower, to which the perianthium of the flower ferves inftead of a capfula feminalis.

VERTICITY, is that property of the loadftone, whereby it turns, or directs itfelf to

to fome peculiar point. See MAGNET.

VERTIGO, in medicine, a difeafe in which the head feems to turn round.

This, according to Dr. Willis, is a diforder in which vifible objects feem continually to turn round, whilft the patients are affected with a perturbation or confufion of the animal fpirits in the brain, which hinders their influx into the nerves. Hence it is, that the vifive and locomotive faculties often fail to fuch a degree, that the patient is ready to drop down, and complains of darknefs. Etmuller divides it into three kinds; the firft of which is a fimple vertigo, in which there is only a tranfient and fhort-continued gyration of objects. The fecond is a dark vertigo, or fcotomia, when the eyes are darkened, or fo affected, as if feveral colours were before them. The third is the vertigo caduca, in which the patient prefently falls down.

A vertigo may be produced by every caufe which can diftend, prefs, or contract the arteries; fuch as fudden fear, furprize, ebriety, and voracity, by which the regular influx and reflux of the animal fpirits into the optic nerves and retina are prevented. Sometimes, alfo, it may be produced by an acid, or any peccant humour, lodged in the ftomach, and vellicating its nerves, which communicate with the retina; for which reafon the hypochondriac and hyfteric paffions may produce a vertigo.

With refpect to the cure, the regimen in general, ought to be the fame with that in the apoplexy or epilepfy. If the patient is plethoric, a due quantity of blood is to be taken away; and if a naufea, lofs of appetite, or any other diforder of the ftomach remain, an emetic is to be prefcribed; then cathartics and fpecifics are to be ordered. According to Mayerne, calamus aromaticus, in whatever form, is good for a vertigo, and efteemed a fecret for that diforder. The fame author informs us, that a german phyfician cured a great many of vertigoes, by pills made of fugar of lead and cyprefs-turpentine; four or five grains of which were to be taken for a dofe, and their ufe perfifted in for fome days. Gliffon, as Bates informs us, after all other medicines had failed, was cured of a fevere vertigo, of three weeks continuance, by fhaving his head, and applying to it a plaifter of the flowers of fulphur and whites of eggs. Some order a cauftic, or a feton, to be applied to the back part of the neck; a cautery to the bregma, and Bates's epileptic electuary, or Fuller's peruvian epileptic electuary, to be ufed internally.

Willis informs us, that after he had in vain tried all other medicines, he, with fuccefs, prefcribed the following powder: Take of the powder of the roots of male piony, two ounces; of the flowers of male piony, one ounce; of peacocks dung, of the whiteft kind, half a pound; and of white fugar, two ounces: reduce to a powder, the dofe of which is to be about the quantity of a fpoonful twice a day, drinking after it a draught of a decoction of fage and rofemary, impregnated with coffee.

Heifter orders camphorated fpirit of wine alone, or mixed with fpirit of hartfhorn, to be applied to the top of the head and temples. And when the diforder proceeds from crudities in the ftomach, he advifes to prepare and diffolve them by neutral falts, that they may be afterwards evacuated by an emetic, or purge. After this, the patient fhould ufe ftomachics and cephalics; as alfo a moderate quantity of wine at meals, which fhould be fparing. Pyrmont-water is alfo faid to be excellent in this cafe.

VERVAIN, *verbena*, in botany. See the article VERBENA.

VERUE, a town of Piedmont, fituated on the river Po, twenty miles north eaft of Turin.

VERU-MONTANUM, in anatomy, a kind of little valve, in the place wherein the ejaculatory ducts enter the urethra. Its ufe is to prevent the urine, in paffing the urethra, from getting in at thefe ducts, and fo mixing with the femen.

VERY LORD, and VERY TENANT, are thofe that are immediate lord and tenant to one another. See the article LORD.

VESICA, in anatomy, a bladder, a membranous or fkinny part in which any humour is contained. See BLADDER.

VESICATORY, *veficatorium*, an external medicine, ferving to raife a blifter; whence, alfo, it is itfelf, though improperly, called a blifter.

Veficatories are unguents, cataplafms, or plafters, made of fharp irritating medicines, which have a faculty of drawing the humours from within, outwards, inflaming and ulcerating the fkin, and raifing veficæ or bladders, whence their denomination veficatory.

We have veficatories made of cantharides, euphorbium, figs, fublimate of mercury,

cury, lapis infernalis, muſtard, anacardium, ſquills, briony, vinegar, pepper, leaven, *&c.* which are incorporated and made up with honey, gums, reſins, *&c.* to bring them to the conſiſtence required.

VESICULA, VESICLE, a diminutive of veſica, ſignifying a little bladder.

The lungs conſiſt of veſiculæ, or lobules of veſiculæ, admitting air from the bronchia; and not only air, but alſo duſt, *&c.* There are ſeveral other parts in the body which bear this appellation; as the veſicula fellis, or gall-bladder, veſiculæ ſeminales, *&c.* See the article GALL, *&c.*

VESPA, the WASP, in zoology. See WASP.

VESPER, or HESPER, in aſtronomy. See the article HESPER.

VESPERS, in the church of Rome, denote the afternoon ſervice, anſwering, in ſome meaſure, to the evening prayers of the church of England. See the articles PRAYER and SERVICE.

VESPERTILIO, the BAT, in zoology, a genus of quadrupeds, of the order of the feræ, the characters of which are theſe: the fore-teeth of the upper jaw are ſix in number, acute, and diſtant from each other; the fore-teeth of the lower jaw are alſo ſix, and acute, but contiguous: the canine teeth are two both above and below, on each ſide: the feet have each five toes; and the fore-feet have the toes connected by a membrane, and expanded into a ſort of wings, whereby it flies; whence this animal has been generally, but with the utmoſt impropriety, ranged among the birds.

The common bat is about the bigneſs of a mouſe, and very much reſembles it in ſhape and colour. There are ſeveral other ſpecies of this creature, ſome with, and others without, a tail.

VESPERTILIONUM ALÆ, BATS-WINGS in anatomy, a name given to the two broad ligaments which connect the bottom of the uterus to the bones of the ilium. See the article UTERUS.

VESPRIN, a town of Lower Hungary, fifty miles ſouth-weſt of Buda.

VESSEL, *vas*, denotes in general any thing for holding liquors; ſuch are our domeſtic cups, pots, *&c.* as alſo the retorts, matraſſes, crucibles, *&c.* of the chemiſts. See RETORT, LABORATORY, *&c.*

In anatomy, all the parts which contain or convey a fluid, are called veſſels; as the veins, arteries, lymphatics, *&c.* See the articles VEIN, ARTERY, *&c.*

Some alſo extend the word veſſel to the nerves, as ſuppoſing them the conduits of the animal ſpirits. See the articles NERVES and ANIMAL SPIRITS.

VESSEL, in navigation, a general name for all ſorts of ſhips. See the article SHIP.

VESTALIA, in roman antiquity, a feſtival celebrated in honour of the goddeſs Veſta, on the fifth of the ides of June; that is, on the ninth of that month.

VESTALS, *veſtales*, among the antient Romans, were prieſteſſes of the goddeſs Veſta, and had the perpetual fire committed to their charge: they were at firſt only four in number, but afterwards increaſed to ſix; and it does not appear, that their number ever exceeded ſix, among whom one was ſuperior to the reſt, and called *veſtalis maxima.*

The veſtals were choſen from ſix to ten years of age, and obliged to ſtrict continency for thirty years; the firſt ten of which were employed in learning the ceremonies of religion, the next ten in the performance of them, and the ten laſt in teaching them to the younger veſtals.

The habit of the veſtals conſiſted of an head-dreſs, called infula, which ſat cloſe to their heads, and from whence hung certain laces called vittæ; a kind of ſurplice made of white linen, and over it a purple mantle with a long train to it.

VESTIBLE, *veſtibulum*, in architecture, a kind of entrance into a large building; being an open place before the hall, or at the bottom of the ſtair-caſe. Veſtibles, intended for magnificence, are uſually between the court and the garden.

The Romans had veſtibles at the entrance of their houſes, for ſheltering thoſe perſons who were obliged to ſtand at the door; and we have now veſtibles of a like kind in many old churches, houſes, *&c.* uſually called porches. See the article PORCH.

The term veſtible is ſometimes alſo uſed for a little anti-chamber, before the entrance of an ordinary apartment.

VESTIBLE *of the ear*, in anatomy, a cavity forming the middle part of the labyrinth of the ear. See the article EAR.

VESTIGIA, a latin term frequently uſed, by engliſh writers, for the traces or footſteps which any thing has left behind it.

VESTRY, a place adjoining to a church, where the veſtments of the miniſter are kept; and alſo a meeting at ſuch place, conſiſting of the miniſter, church-wardens, and chief men of moſt pariſhes, who make a pariſh veſtry or meeting. By

custom there are select vestries, being a certain number of persons chosen to have the government of the parish, make rates, and take the accounts of church-wardens, *&c.* And it is here to be observed, that when any rates are made, the parishioners must have notice of a vestry held for that purpose; in which case all that are absent shall be concluded by a majority of the parishioners present, who in construction of law are the whole parish. Vestries of parishes are to be consulted by parish officers; and if a parishioner, who has a right to be present and vote at a vestry, be shut out of the vestry-room, action of the case lies.

VESTURE, or INVESTITURE, in law. See the article INVESTITURE.

VESUVIUS, a famous vulcano, or burning mountain, situated only six miles east of the city of Naples, in Italy. See the article VULCANO.

VETCH, *vicia*, in botany, a genus of the diadelphia-decandria class of plants, with a papilionaceous flower; and its fruit is a long, bivalve, and coriaceous pod, containing several roundish seeds.

VETCH also makes part of the names of other plants; as the bitter vetch, horse-shoe vetch, *&c.* See the articles OROBUS and HIPPOCREPIS.

VETERAN, among the antient Romans, an appellation given to a soldier who was grown old in the service, or had made a certain number of campaigns.

VETERNUS, or LETHARGY, in medicine. See the article LETHARGY.

VETITUM NAMIUM, in law, imports a forbidden distress; such, *e. gr.* is that when the bailiff of a lord distrains beasts or goods, and the lord forbids his bailiff to deliver them when the sheriff comes to replevy them, and to that end drives them to places unknown.

VEXES, or *Ne injuste* VEXES, in law. See the article NE INJUSTE.

VIA-LACTEA, in astronomy, the milky-way, or galaxy. See GALAXY.

VIA-SOLIS, *the sun's way*, in astronomy, is used, among some astronomers, for the ecliptic line, so called, because the sun never goes out of it. See ECLIPTIC.

VIÆ PRIMÆ, first passages, among physicians, are the œsophagus, stomach, and guts; including the whole length of the alimentary duct, or canal, from the mouth to the sphincter ani.

VIALES, in mythology, a name given among the Romans to the gods who had the care and guard of the roads and highways.

The dii viales, according to Labeo, were of the number of those gods called dii animales, who were supposed to be the souls of men changed into gods; and were of two kinds, *viz.* the viales and penates. See LARES.

VIANA, a town of Navarre, in Spain, situated on the river Ebro, forty-six miles south-west of Pampeluna.

VIANA is also a port-town of Portugal, thirty-six miles north of Oporto.

VIANDEN, a town of Luxemburg, twenty miles north of the city of Luxemburg.

VIATICUM, in the church of Rome, an appellation given to the eucharist, when administered to persons at the point of death. See the article EUCHARIST.

VIATOR, in roman antiquity, an appellation given in common to all officers of any of the magistrates; as lictors, accensi, scribes, cryers, *&c.* See the article LICTOR, *&c.*

VIBEX, is sometimes used, by physicians, for a black and blue spot in the skin, occasioned by an afflux or extravasation of blood.

VIBRATION, in mechanics, a regular, reciprocal motion of a body, as a pendulum, *&c.* which, being freely suspended, swings or oscillates, first this way, then that. See the article PENDULUM.

VIBRATION is also used, in physics, for divers other regular alternate motions: thus sensation is supposed to be performed, by means of the vibratory motion of the nerves, begun by external objects, and propagated to the brain.

VIBURNUM, in botany, a genus of the pentandria-trigynia class of plants, with a monopetalous, campanulated flower, semiquinquifid at the limb: the fruit is a roundish unilocular berry, containing a single, osseous, compressed, and striated seed.

This genus comprehends the tinus, or laurustine; the opulus, or water-elder; and the viburnum of authors, called in english the way-faring-tree.

VICAR, *vicarius*, a person appointed, as deputy to another, to perform his functions in his absence, and under his authority.

VICAR, in the canon law, denotes a priest of a parish, the predial tithes whereof are impropriated or appropriated; that is, belong either to a chapter, religious house, *&c.* or to a layman, who receives them,

them, and only allows the vicar the ſmall tithes or a convenient ſalary, antiently called portio congrua.

Vicar-general, was a title given by king Henry VIII. to Thomas Cromwell, earl of Eſſex, with full power to overſee the clergy, and regulate all matters relating to church affairs.

VICE, *vitium*, in ethics, is ordinarily defined an elective habit, deviating, either in exceſs, or defect, from the juſt medium wherein virtue is placed. See the articles Habit, Virtue, &c.

Vice, in ſmithery, and other arts employed in metals, is a machine, or inſtrument, ſerving to hold faſt any thing they are at work upon, whether it is to be filed, bent, rivetted, &c. To file ſquare, it is abſolutely neceſſary that the vice be placed perpendicular with its chaps parallel to the work-bench.

*Hand*-Vice, is a ſmall kind of vice ſerving to hold the leſſer works in, that require often turning about.

Of theſe there are two kinds, the broad-chapped hand-vice, which is that commonly uſed; and the ſquare-noſed hand-vice, ſeldom uſed but for filing ſmall round work. See Smithery.

Vice is alſo a machine uſed by the glaziers to turn or draw lead into flat rods, with grooves on each ſide to receive the edges of the glaſs.

Vice is alſo uſed, in the compoſition of divers words, to denote the relation of ſomething that comes inſtead, or in the place, of another; as vice-admiral, vice-chancellor, vice-chamberlain, vice-preſident, &c. are officers who take place in the abſence of admirals, &c. See the articles Admiral, Chancellor, &c.

Vice-roy, a governor of a kingdom, who commands in the name and ſtead of a king, with full and ſovereign authority. See the article King.

Vice versa, a latin phraſe, importing on the contrary: thus, as the ſun mounts higher and higher above the horizon, the ſhadows of things decreaſe; and *vice verſa*, as he deſcends lower, they increaſe.

VICH, a town of Catalonia, in Spain, 30 miles north of Barcelona.

VICIA, the vetch, in botany. See the article Vetch.

VICISSITUDE, the regular ſucceſſion of one thing after another; as the viciſſitude of day and night, of the ſeaſons, &c.

VICOVARO, a town of Italy, forty miles north-eaſt of Rome.

VICOUNT, in old law-books, ſignifies the ſame with ſheriff. See Sheriff.

Vicount, or Viscount, is alſo a degree of nobility next below a count, or earl, and above a baron. See the articles Nobility, Earl, &c.

VICOUNTIEL, in law-books, ſomething belonging to, or falling within the ſheriff's juriſdiction: thus writs vicountiels are writs triable in the ſheriff's court; and there are certain vicountiel rents, whereof the ſheriff keeps a particular roll, that uſually comes under the title of firma comitatus.

Alſo vicountiel juriſdiction, is that which belongs to officers of a county; as ſheriff, coroner, eſcheator, &c. See Sheriff, &c.

VICTIM, *victima*, denotes a bloody ſacrifice offered to ſome deity, of a living creature, as a man or beaſt, which is ſlain to appeaſe his wrath, or obtain ſome favour. See the article Sacrifice.

VICTIMARIUS, in antiquity, a miniſter or ſervant of the prieſt, whoſe office was to bind the victims, and prepare the water, knife, and other things neceſſary for the ſacrifice. See Sacrifice.

To the victimarii it alſo belonged to knock down and kill the victims, in order to which they ſtood cloſe by the altar naked to the waiſt, but crowned with laurel; and holding a hatchet or a knife up, aſked the prieſt leave to ſtrike; ſaying, *agône?* whence they were called agones and cultellarii. See Agon.

When the victim was killed, they opened it, and after viewing the entrails, took them away, waſhed the carcaſe, ſprinkled the flour on it, &c. The ſame victimarii lighted the fire wherein books were condemned to be burnt.

VICTORIA, or Vitoria, a town of the province of Biſcay, in Spain, thirty miles ſouth of Bilboa.

VICTORY, *victoria*, the overthrow or defeat of an enemy, in war or combat.

VICTUALLING-Office, an office kept on Tower-hill, London, for the furniſhing his majeſty's navy with victuals. See the article Navy.

It is managed by ſeven commiſſioners who have their inferior officers, as ſecretaries, clerks, &c. beſides agents in divers parts of Great Britain, Ireland, &c. See the article Commissioners, &c.

VICTUALS, ſignifies any ſuſtenance, or things neceſſary to live upon, as meat and proviſions; which are to be ſold at a reaſonable price, aſſeſſed by juſtices, &c on pain of forfeiting double the value. By the cuſtom of ſome manors, they chooſe yearly

yearly furveyors of victuals. See ASSISE.

VIDAMES, certain officers under the bifhops of France, for the adminiftration of juftice, and prefervation of the temporalities of the bifhoprics.

VIDIN, or WIDIN, a town of european Turky, in the province of Servia, fituated on the river Danube, in eaft long. 24°, and north lat. 43° 50′.

VIENNA, the capital city of the circle of Auftria and of the german empire, is fituated on the Danube, in eaft long. 16° 20′, and north lat. 48° 20′.

Vienna is an archbifhop's fee, and has a celebrated univerfity.

VIENNE, a town of Dauphine, in France, fituated on the river Rhone, 18 miles fouth of Lyons. It is an archbifhop's fee.

VI ET ARMIS, in law, are words made ufe of in indictments and actions of trefpafs, to fhew the violent commiffion of any trefpafs or crime; but in an appeal of death, or where a perfon is killed with a weapon, thefe words are not held neceffary, becaufe the violence is implied.

VIEW, in law, fignifies the particular act of viewers; as where a real action is brought, and the tenant does not certainly know what land it is the defendant requires; then he may pray that the jury may view the fame, that is to fay, fee the land that is claimed. But it is held, that in all cafes of viewing, the thing in controverfy is only to be fhewn to the jurors, and no evidence can be given relating to it on either fide: and here if wafte be alledged to be done in every room of a houfe, the view of the houfe generally is fufficient.

VIEW *of frank pledge*, is the office which the fheriff in his county-court, the fteward in the leet, or the bailiff in his hundred, performs in looking to the king's peace, and feeing that every man be in fome pledge.

VIGEVANO, a town of the dutchy of Milan, in Italy, fixteen miles fouth-weft of Milan.

VIGILS, in church-hiftory, are the fafts appointed before certain feftivals, in order to prepare the mind for a due obfervation of the enfuing folemnity.

VIGINTIVIRATE, a tribunal or court among the antient Romans, firft eftablifhed by Cæfar, confifting of twenty members, three of whom judged of all criminal matters; three others had the infpection of the coins; four others had the infpection of the ftreets of Rome; and the reft were judges of civil affairs.




VIGNAMONT, a town of the bifhopric of Liege, in Germany, two miles north of Huy.

VIGO, a port-town of Galicia, in Spain, 70 miles fouth-eaft of Cape Finifterre: weft long. 9° 18′, north lat. 42° 15′.

VILLA-BOHIM, a town of Portugal, ten miles fouth-weft of Elvas.

VILLA-FRANCA, the name of feveral towns, one in Piedmont, three miles eaft of Nice; another of Catalonia, eighteen miles weft of Barcelona; a third, the capital of St. Michael, one of the Azores; and a fourth, a town of Eftremadura, in Spain, fifty-four miles fouth-eaft of Salamanca.

VILLA-FRANCHE, a town of Orleanois, in France, twelve miles north of Lyons.

VILLACH, a town of Carinthia, in Germany, twenty miles weft of Clagenfurt.

VILLAGE, an affemblage of houfes, inhabited chiefly by peafants and farmers, and having no market, whereby it is diftinguifhed from a town. See the articles CITY and TOWN.

Fleta tells us, that the difference made between a manfion, a village, and a manor, is this, *viz.* a manfion may confift of one or more houfes, but muft be of one dwelling place, and none near it; for if other houfes are contiguous, it is then a village; and a manor confifts of feveral villages, or of one alone.

Where in legal proceedings a place is named generally, it fhall be taken for a vill, becaufe as to civil purpofes the kingdom was firft divided into vills; yet it has been held, that a vill and a parifh fhall be intended the fame.

VILLAIN, or VILLEIN, *villanus*, in our antient cuftoms, denotes a man of fervile and bafe condition, *viz.* a bondman or fervant: and there were antiently two forts of bondmen or villains in England; the one termed a villain in grofs, who was immediately bound to the perfon of his lord and his heirs; the other a villain regardant to a manor, he being bound to his lord as a member belonging and annexed to the manor whereof the lord was owner; and he was properly a pure villain, of whom the lord took redemption to marry his daughter, and to make him free; and whom the lord might put out of his lands and tenements, goods and chattels at his will, and beat and chaftife, but not maim him.

VILLA REAL, the name of two towns, the

the one in Spain, thirty miles north of Valencia; and the other in Portugal, fifty miles east of Porto.

Villa del rey, a town of Spain, ten miles north of Badajox.

Villa rica, a port-town of Mexico, situated on the gulph of Mexico, in west long. 100°, and north lat. 20°.

Villa viciosa, the name of two towns of Spain, one forty-seven miles north-east of Madrid; and the other a port-town of Asturias, twenty-two miles north-east of Oviedo: west long. 6° 6′, north lat. 43°.

VILLENA, a town of New Castile, in Spain, forty miles north of Murcia: west long. 1° 15′, north lat. 38° 46′.

VILLENAGE, a kind of antient tenure, whereby the tenant was bound to do such services as the lord commanded, or such as were fit for villains or bondmen to perform.

VILLENOUS, or Villainous judgment, in law, that which degrades and casts shame and reproach upon the offender; so that he shall not be of any credit afterwards, nor shall it be lawful for him to approach the king's court, *&c.*

VILLI, among botanists, a kind of down like coarse hair, or the grain or shag of plush, with which some trees abound.

VILLOSE, or Villous, something abounding with villi, or fibres like coarse hairs: such is one of the coats of the stomach. See the article Stomach.

VILVORDE, a town of Brabant, seven miles north of Brussels.

VINALIA, in roman antiquity, a festival on the ninth of the kalends of May, in honour both of Jupiter and Venus.

VINCA, the periwinkle, in botany, a genus of the pentandria-monogynia class of plants, the flower of which consists of a single saucer-like petal, with an horizontal limb, divided into five segments: the pericarpium consists of two erect, cylindric, and long follicles, formed of one valve, and opening longitudinally: the seeds are numerous, oblong, cylindric, and fulcated.

*Cape* VINCENT, the most south-west promontory of Portugal: west long. 10°, and north lat. 36° 55′.

*St.* Vincent, one of the Caribbee-islands, seventy-five miles west of Barbadoes.

*St.* Vincent, is also a province of Brazil, bounded by the Rio Janiero on the north, by the Atlantic on the east, by the province of del Rey on the south, and by that of the spanish La Plata on the west.

VINCULUM, in mathematics, a character in form of a line, or stroke, drawn over a factor, divisor, or dividend, when compounded of several letters or quantities, to connect them, and shew they are to be multiplied, or divided, *&c.* together by the other term. Thus $d \times \overline{a + b - c}$ shews that $d$ is to be multiplied into $a + b - c$.

VINDEMIATING, the gathering of the grapes, or other ripe fruits, as the apples, pears, cherries, *&c.* See Vintage.

VINDEMIATRIX, or Vindemiator, a fixed star of the third magnitude in the constellation virgo, whose latitude is 16° 12′ 34″ north, and longitude 5° 37′ 40″ of libra, according to Mr. Flamsteed's catalogue.

VINDICATION, or Claiming, in the civil law, an action arising from the property a person has in any thing; or a permission to take or seize a thing, as one's own, out of the hands of a person, whom the law has doomed not to be the true proprietor.

VINE, *vitis*, a noble plant or shrub of the creeping kind, famous for its fruit, or grapes, and for the liquor they afford. See the article Wine.

The vine constitutes a genus of the pentandria-monogynia class of plants, the flower of which consists of five small, deciduous, and rude petals, growing together at their extremities; and its fruit is a large roundish berry, containing five osseous, semiorbicular, and turbinato-cordated seeds, narrow at the base.

Our gardeners find, that vines are capable of being cultivated in England, so as to produce large quantities of grapes; and those ripened to such a degree, as may afford a good substantial vinous juice. Witness the vineyards in Somersetshire; particularly that famous one at Bath. In effect, it does not seem so much owing to the inclemency of our English air, that our grapes are generally inferior to those of France, as to the want of a just culture. Those fitted for the English climate, Mr. Mortimer finds to be the black grape, the white muscadine, parsley-grape, muscadilla, white and red frontiniac. Mr. Bradley recommends the July-grape, the early sweet water-grape, lately brought from the Canaries, and the Arbois, or french sweet water-grape: all which, if well managed, and the weather favourable, are ripe by the middle of August. He also recommends the claret and Burgundy-grapes.

Vines are propagated either by layers, or cuttings; that is, either by laying down the young branches, as soon as the fruit is gathered, or by making plantations of slips, or cuttings, at that time. Mr. Mortimer says, it may be done any time in the winter before January; though Bradley says, he has done it, with success, in March and April.

For the best soil for vines, and the method of cultivating them, see the article VINEYARD.

VINEGAR, *acetum*, an acid penetrating liquor, prepared from wine, cyder, beer, &c. of considerable use both as a medicine and sauce. See the articles WINE CYDER, &c.

The process of turning vegetable matters to vinegar, is thus delivered by Dr. Shaw: take the skins of raisins, after they have been used in making wine; and pour three or four times their own quantity of boiling water upon them, so as to make a thin aqueous mixture. Then set the containing cask, loosely covered, in a warmer place than is used for vinous fermentation; and the liquor in a few weeks time will become a clear and sound vinegar; which being drawn off from its sediment, and preserved in another cask, well stopped down, will continue perfect, and fit for use.

This experiment shews us a cheap and ready way of making vinegar from refuse materials; such as the husks of grapes, decayed raisins, the lees of wine, grounds of ale, beer, &c. which are frequently thrown away as useless. Thus, in many wine countries, the marc, rape, or dry pressing of grapes are thrown in heaps, and suffered to putrify unregarded; though capable of affording as good vinegar, as the wine itself. In some places they bury copper-plates in these husks, in order to make verdigrease; but this practice seems chiefly confined to the southern parts of France. Our present experiment shews us how to convert them to another use; and the direction extends to all the matters that have once undergone, or are fit to undergo, a vinous fermentation, for that all such matters will afford vinegar. Thus all our summer-fruits in England, even blackberries; all the refuse washings of a sugar-house, cyder pressings, or the like, will make vinegar, by means of water, the open air, and warmth. See the article VERDEGREASE.

The whole process, whereby this change is effected, deserves to be attentively considered. And, first, the liquor to be thus changed, being kept warmer than in vinous fermentation, it, in a few days, begins to grow thick, or turbid; and without throwing up bubbles, or making any considerable tumult, as happens in vinous fermentation, deposits a copious sediment. The effect of this separation begins to appear first on the surface of the liquor, which gathers a white skin, that daily increases in thickness, till at length it becomes like leather; and now, if continued longer in this state, the skin turns blue, or green, and would at last grow solid, and putrify: therefore, in keeping down this skin as it grows, and thrusting it gently down to the bottom of the vessel, consists much of the art of vinegar-making, especially from malt. For the difference between vinous and acetous fermentation, see the article FERMENTATION.

*Method of making Cyder*-VINEGAR. The cyder (the meanest of which will serve the purpose) is first to be drawn off fine into another vessel, and a quantity of the must, or pouz of apples, to be added: the whole is set in the sun, if there be a conveniency for the purpose; and, at a week or nine days end, it may be drawn off. See the article CYDER.

*Method of making Beer*-VINEGAR. Take a middling sort of beer, indifferently well hopped; into which, when it has worked well, and is grown fine, put some rape, or husks of grapes, usually brought home for that purpose: mash them together in a tub; then, letting the rape settle, draw off the liquid part, put it into a cask, and set it in the sun as hot as may be; the bung being only covered with a tile, or slate stone: and in about thirty or forty days, it will become a good vinegar, and may pass in use as well as that made of wine, if it be refined, and kept from turning musty.

Or thus: to every gallon of spring-water, add three pounds of Malaga-raisins; which put into an earthen jar, and place them where they may have the hottest sun from May till Michaelmas: then, pressing all well, turn the liquor up in a very strong iron-hooped vessel, to prevent its bursting: it will appear very thick and muddy, when newly pressed; but will refine in the vessel, and be as clear as wine. Thus let it remain untouched

touched for three months, before it be drawn off, and it will prove excellent vinegar.

*Method of making Wine*-VINEGAR. Any fort of vinous liquor, being mixed with its own fæces, flowers, or ferment, and its tartar, firft reduced to powder; or elfe with the acid and auftere ftalks of the vegetable from whence the wine was obtained, which hold a large proportion of tartar: and the whole being kept frequently ftirring in a veffel which has formerly held vinegar, or fet in a warm place full of the fteams of the fame, will begin to ferment a-new, conceive heat, grow four by degrees, and foon after turn into vinegar.

The remote fubjects of acetous fermentation are the fame with thofe of vinous; but the immediate fubjects of it are all kinds of vegetable juices, after they have once undergone that fermentation which reduces them to wine: for it is abfolutely impoffible to make vinegar of muft, the crude juice of grapes, or other ripe fruits, without the previous affiftance of vinous fermentation.

The proper ferments for this operation, whereby vinegar is prepared, are, 1. The fæces of all acid wines. 2. The lees of vinegar. 3. Pulverifed tartar; efpecially that of rhenifh wine, or the cream or cryftals thereof. 4. Vinegar itfelf. 5. A wooden veffel, well drenched with vinegar, or one that has been long employed to contain it. 6. Wine that has often been mixed with its own fæces. 7. The twigs of vines, and the ftalks of grapes, currants, cherries, or other vegetables of an acid auftere tafte. 8. Bakers-leaven, after it is turned acid. 9. All manner of ferments, compounded of thofe already mentioned.

The french ufe a method of making vinegar different from that above defcribed. They take two very large oaken veffels, the larger the better, open at the top; in each whereof they place a wooden grate, within a foot of the bottom: upon thefe grates, they firft lay twigs, or cuttings of vines, and afterwards the ftalks of the branches, without the grapes themfelves, or their ftones; till the whole pile reaches within a foot of the brim of the veffels: then they fill one of thefe veffels with wine to the very top, and half fill the other; and with liquor drawn out of the full veffel, fill up that which was only half full before; daily repeating the fame operation, and pouring the liquor back from one veffel to the other; fo that each of them is full, and half full, by turns.

When this procefs has been continued for two or three days, a degree of heat will arife in the veffel, which is then but half full, and increafe for feveral days fucceffively, without any appearance of the like in the veffel which happens to be full, during thofe days; the liquor whereof will ftill remain cool: and as foon as the heat ceafes in the veffel that is half full, the vinegar is prepared: which, in the fummer, happens on the fourteenth or fifteenth day from the beginning; but in the winter, the fermentation proceeds much flower: fo that they are obliged to forward it by artificial warmth, or the ufe of ftoves.

When the weather is exceeding hot, the liquor ought to be poured off from the full veffel into the other twice a-day: otherwife, the liquor would be overheated, and the fermentation prove too ftrong; whence the fpirituous parts would fly away, and leave a vapid wine, inftead of vinegar, behind.

The full veffel is always to be left open at the top, but the mouth of the other muft be clofed with a cover of wood, in order the better to keep down and fix the fpirit in the body of the liquor; for otherwife, it might eafily fly off in the heat of fermentation. The veffel that is only half full feems to grow hot, rather than the other, becaufe it contains a much greater quantity of the vine-twigs and ftalks, than that, in proportion to the liquor; above which the pile, rifing to a confiderable height, conceives heat the more, and fo conveys it to the wine below.

Vinegar is a medicine of excellent ufe in all kinds of inflammatory and putrid diforders, either internal or external: in ardent, bilious fevers, peftilential and other malignant diftempers, it is recommended by Boerhaave as one of the moft certain fudorifics. Weaknefs, fainting, vomiting, hyfterical and hypochondriacal complaints have alfo been frequently relieved by vinegar applied to the mouth and nofe, or received into the ftomach. Diftilled vinegar has the fame virtues, only in a ftronger degree.

There are alfo medicated vinegars, as vinegar of antimony, of elder, litharge, rofes, fquills, treacle, *&c.* which derive their chief virtues from vinegar.

VINEYARD, *vinetum*, a plantation of vines. See the article VINE.

The

The beſt ſituation of a vineyard is on the declivity of an hill, lying on the ſouth. See the article EXPOSURE.

For the planting of a vineyard, obſerve the following method. In the month of July, while the outermoſt coat of the earth is very dry and combuſtible, plough up the ſward; denſhire, or burn-beat it, according to art, and in January following, ſpread the aſhes. The ground being thus prepared, cut your trenches acroſs the hill from eaſt to weſt, becauſe the vines being thus in ranks, the riſing and ſetting of the ſun will by that means paſs through the intervals, which it would not do if they were ſet in any other poſition, neither would the ſun dart its rays upon the plants during the whole courſe of the day. See PLANTING. Afterwards ſtrain a line, and dig a trench about a foot deep, place your ſetts in it about three feet diſtance from one another, trim off the ſuperfluous roots, leaving no more than three or four eyes or buds upon that which is above ground, and plant them near half a foot deep, ſloping after the manner the quick is commonly ſet, ſo as they may point up the hill. That done, take long dung or ſtraw, and lay it on the trenches in a convenient thickneſs to cover the earth, and to preſerve the roots from the dry piercing winds, which would otherwiſe much annoy them, and from the exceſſive ſcorching heats in ſummer; keep them well hoed, and free from weeds, and water them as occaſion ſerves; the beſt time to plant is in January. See the article MANURE.

The firſt pruning of the new-ſet vine ought not to be till January, and then you ſhould cut off all the ſhoots as near as you can, ſparing but one of the moſt thriving, on which you are to leave only two or three buds, and ſo let all reſt till May, the ſecond year after planting. Then take care from time to time to deſtroy the weeds, and be ſure to clear the roots of all ſuckers, which do but rob and draw out the virtue of your ſets. The ſame method is to be followed the third year; then dig your whole vineyard, and lay it very level; taking care in this operation not to cut or wound any of the main roots with your ſpade. As for the younger roots, it is not ſo material, in regard that they will grow but the thicker; and this year you may enjoy ſome of the fruits of your vineyard, which if anſwerable to your expectation, will put you upon providing props for your vines, of about four feet long, which muſt be placed on the north-ſide of the plant. In May, rub off ſuch buds as you ſuſpect will produce ſuperfluous branches. When the grapes are about the bigneſs of birding-ſhot, break off the branches with your hand at the ſecond joint above the fruit, and tie the reſt to the prop: here it is moſt adviſeable to break, and not cut your vine; becauſe wounds made with a ſharp inſtrument are not apt to heal, but cauſe the plants to bleed. See the articles PRUNING, LOPPING, *&c.*

The fourth year you would be likely to have three or four ſhoots to every plant: and therefore in December, cut off all the branches except one of the ſtrongeſt and moſt thriving, which leave for a ſtandard about four feet high, paring away the reſt very cloſe to the body of the mother-plant, which tie to your prop, till it be big enough to make a ſtandard of itſelf. Neither muſt you ſuffer any ſhoot to break out but ſuch as ſprout at the top, four feet from the ground, all which ſprouts the French uſually prune off every year, and abſolutely truſt to the new ſprouts that are only bearing ſhoots.

In Auguſt, when the fruit begins to ripen, break off ſuch ſhoots as you find too thick; and if you perceive any plant bleed, rub ſome aſhes on it; or, if that will not do, ſear it with a hot iron. When upon ſtirring your vineyard it appears to be poor, prune the vines as before directed, and ſpread good dung, mixed with lime, over the whole ground, letting it lie all the winter to waſh into the earth, mixing about ten buſhels of lime with a load of dung, and if ſome aſhes and ſoot be likewiſe thrown on, it will do well. Turn in this manure, about February, with a ſlight digging, but not too deep, which ſhould be done in a dry ſeaſon, and not in wet weather, leſt it make the ground bind too much and occaſion the growth of rank weeds. But to forward the ripening of grapes, and render them fruitful, the blood of beaſts mixed with lime or ſoot, is very proper; laying it to the roots of the vines in December and July; and if the ſeaſon be very dry, the watering them in Auguſt is a great advantage. See the article DUNGING.

As to the ſoil of a vineyard, it is agreed that

that nothing can be too dry for it; and as to the ſorts of vines, none but the forward ones ought to be planted in England.

VINOUS, *vinoſus*, ſomething that relates to wine, or that has the taſte and ſmell thereof. See the article WINE.

All vegetables, by a due treatment, afford a vinous liquor, as corn, pulſe, nuts, apples, grapes, *&c.* A ſecond fermentation, duly managed, turns any vinous liquor into an acetous one. The proper character and effect of fermentation are to produce either a vinous or an acetous quality in the body fermented. See the article FERMENTATION.

VINTAGE, a crop of wine, or what is got from the vines each ſeaſon. See VINE, VINEYARD, and VINE.

The word is alſo uſed for the time or ſeaſon of gathering or preſſing the grapes. See GRAPES and *Wine*-PRESS.

VINTIMIGLIA, a port-town of Italy, in the territory of Genoa, ſituated on the Mediterranean, ſeventeen miles eaſt of Nice, and one hundred ſouth-weſt of Genoa-city.

VINUM, a liquor or drink commonly called wine. See the article WINE.

VINUM, in medicine, *vinum medicatum*, is particularly applied to ſeveral medicated wines, that is, medicinal preparations, whereof wine is the baſis. The original intention of medicated wines, was for exhilarating medicines, which were to be continued for a length of time in the moſt familiar and agreeable form: by this means a courſe of remedies was complied with, notwithſtanding the repugnance and averſion which the ſick often manifeſt to thoſe directly furniſhed from the ſhops; and hence the inferior ſort of people had their medicated ales. Neverthelefs, as vinous liquors are excellent for extracting the virtues of ſeveral ſimples, and are not fitted for keeping, they have been employed as officinal menſtrua alſo; and ſubſtances of the greateſt efficacy are truſted in this form. The moſt noted of theſe medicated wines to be met with in diſpenſatories, are the vinum aleoticum, or alkaline, aleotic wine: vinum amarum, or bitter wine: vinum antimoniale, or antimonial wine: vinum aromaticum, or aromatic wine: vinum chalybeatum, ſteel wine: vinum croceum, ſaffron wine: vinum emeticum, emetic wine: vinum guaiacum, guaiacum wine: vinum ipecacoanhæ, wine of ipecacoanha: vinum millepedatum, wine of millepedes: vinum peruvianum, wine of peruvian bark: vinum ſcorbuticum, ſcorbutic wine; and vinum viperinum, viper wine.

VIOL, *viola*, a muſical inſtrument of the ſame form with the violin, and ſtruck like that with a bow. See VIOLIN.

There are viols of divers kinds. The firſt and principal, among us, is the baſs-viol, called by the Italians viola digamba, or leg-viol, becauſe held between the legs. It is the largeſt of all, and is mounted with ſix ſtrings: its neck is divided in half notes by ſeven frets fixed thereon: its ſound is very deep, ſoft and agreeable. The tablature, or muſic for the baſs-viol, is laid down on ſix lines or rules. What the Italians call alto viola is the counter-tenor of this; and their tenore viola, the tenor. They ſometimes call it ſimply the viol: ſome authors will have it the lyra, others the cithara, others the chelys, and others the teſtudo of the antients. See LYRA, CITHARA, *&c.* 2. The love-viol, viola d' amore, which is a kind of triple-viol or violin, having ſix braſs or ſteel ſtrings, like thoſe of the harpſichord, ordinarily played with a bow. This yields a kind of ſilver ſound, which is very agreeable. 3. A large viol with forty-four ſtrings, called by the Italians viola di bardone, but little known among us. 4. Viola baſtarda, or baſtard viol of the Italians; not uſed among us. Broſſard takes it to be a kind of baſs viol mounted with ſix or ſeven ſtrings, and tuned as the common one. 5. What the Italians call viola di braccio, arm-viol, or ſimply braccio, arm, is an inſtrument anſwering to our counter-tenor, treble, and fifth violin. 6. Their viola prima, or firſt viol, is really our counter-tenor violin; at leaſt, they commonly uſe the cliff C *ſol ut* on the firſt line to denote the piece intended for this inſtrument. 7. Viola ſecunda is much the ſame with our tenor-violin, having the cliff of C *ſol ut* on the ſecond line. 8. Viola terza is nearly our fifth violin, the cliff C *ſol ut* on the third line. 9. Viola quarta, or fourth viol, is not known in England or France, though we frequently find it mentioned in the italian compoſitions; the cliff on the fourth line. Laſtly their violetta, or little viol, is in reality our triple-viol, though ſtrangers frequently confound the term with what has been ſaid of the viola prima, ſecunda, terza, *&c.*

VIOL is alſo a term uſed among mariners when

when an hawfer, or ftrand rope, is bound faft with nippers to the cable, and brought to the jeer-capftan for the better weighing of the anchor when the main-capftan proves infufficient.

VIOLA, the VIOLET, in botany, a genus of the fyngenefia-polygamia-monogamia clafs of plants, the corolla whereof is compofed of five ringent irregular petals, and is corniculated behind: the fruit is a roundifh, trigonal, obtufe capfule, formed of three valves, and containing three cells: the feeds are numerous, roundifh, and appendiculated.

The officinal flowers of the violet have a very pleafant fmell, and impart a deep purplifh blue colour, denominated from them violet. They impart their colour and flavour to aqueous liquors. A fyrup made from this infufion has long maintained a place in the fhops, and proves an agreeable and ufeful laxative to children.

VIOLATION, the act of violating; that is, forcing a woman, or committing a rape upon her. See the article RAPE.

This term is alfo ufed in a moral fenfe for a breach or infringement of a law, ordinance, or the like; and it is alfo ufed for profanation. See TRANSGRESSION.

VIOLENT, in the fchools, a thing done by force. In which fenfe it ftands oppofed to fpontaneous. See the article SPONTANEOUS.

A thing is faid to be violent when effected by fome external principle, the body that undergoes it contributing nothing thereto, but ftruggling againft it. The fchoolmen allow, that man, as being endued with reafon, is capable of fuffering fuch violence, but brute and inanimate bodies are not.

VIOLET, *viola*, in botany. See VIOLA.

VIOLIN, or FIDDLE, a mufical inftrument mounted with four ftrings, or guts, and ftruck, or played, with a bow.

The violin, like moft other inftruments, confifts of three parts, the neck, the table, and the found-board. At the fides are two apertures, and fometimes a third is added towards the top, fhaped like an heart. Its bridge, which is below the apertures, bears up the ftrings which are faftened to the two extremes of the inftrument, at one end of them to a fcrew, which ftretches or loofens them at pleafure.

The ftyle and found of the viol is the gayeft, moft lively, and fprightly of all other inftruments; and hence it is, of all others, the fitteft for dancing: yet there are ways of touching it which render it grave, foft and languifhing, and fit for church or chamber mufic. It generally makes the treble or higheft part in concerts. It is tuned by fifths: its play is compofed of bafs, counter-tenor, tenor, and treble: to which may be added a fifth part: each part has four fifths, which rife to a greater feventeenth. See the article FIFTH, *&c.*

In compofitions of mufic the violin is denoted by V; two V V denote two violins. The word violin, alone, ftands for treble violin. When the Italians prefix alto, tenore, or baffo, it then expreffes the counter-tenor, tenor, or bafs violin. In compofitions, where there are two, three, or more different violins, they make ufe of primo, fecundo, terzo, or of the characters I°, II°, III°, or 1°, 2°, 3°, *&c.* to denote the difference.

The violin has only four ftrings, each of a different thicknefs; the fmalleft whereof makes the *e fi mi* of the higheft octave of the organ; the fecond, a fifth below the firft, makes the *a mi la*; the third, a fifth below the fecond, is *d la re*; laftly, the fourth, a fifth below the third, is *ge re fol.* Moft nations ordinarily ufe the cliff *ge re fol* on the fecond line, to denote the mufic for the violin only. In France they ufe the fame cliff as the firft line at bottom. The firft of thefe methods is beft where the fong goes very low; the fecond, where it goes very high.

VIOLONCELLO of the Italians is properly our fifth violin; which is a little bafs-violin, half the fize of the common bafs-violin, and its ftrings juft half as thick and half as long, which renders the found juft an octave higher than the fame. See the article VIOLIN.

VIOLONE, in mufic, a double bafs, almoft twice as big as the common bafs-violin, and the ftrings bigger and longer in proportion, and confequently its found an octave lower than that of our bafs-violin, which has a noble effect in great concerts. See CONCERT and VIOLIN.

VIPER, in zoology, a fpecies of coluber, with the fcuta of the abdomen an hundred and forty-five, and the fquammæ of the tail, thirty-fix. See COLUBER.

This is the moft poifonous and mifchievous in its bite of all the european ferpents. It grows to near three feet in length, and to a confiderable thicknefs in proportion. The principal ground-colour of the body is a dufky grey: all along the

back there runs a broad brown line, which is dentated on each fide; and on each fide of this there is a kind of continued bluifh line, formed of a feries of fpots of that colour, one of which is fituated in the fpace formed by every denticulation in the back line: the belly is of a bluifh black, very bright and gloffy, refembling the colour of high polifhed, fanguined fteel; and when clofely examined, there is found a fmall dot of a deep black at the apex of every fcale. The head is large and flattifh: the throat is of a pale colour; and the mouth is large: the edge of the upper lip is whitifh: the iris of the eye is of a flame colour; the pupil black; and there is a blue fpace, forming an acute angle, which feparates the head from the longitudinal line on the back. The poifon of this ferpent is confined to its mouth: at the bafis of the phangs, or long teeth, which it wounds with, is lodged a little bag containing the poifonous liquid, a very minute portion of which mixed immediately with the blood, proves fatal. Our viper-catchers are faid to prevent the mifchiefs otherwife following from the bite, by rubbing oil olive warm on the part. The flefh of the viper is perfectly innocent, and ftrongly recommended as a medicine of extraordinary fervice in fcrophulous, leprous, and other chronical diforders: its virtues however in thefe cafes, are probably too much exaggerated. The viper is undoubtedly a high nutritious food, and thence, in fome kinds of weakneffes and emaciated habits, is not undefervedly looked on as a good reftorative. To anfwer any valuable purpofes, frefh vigorous vipers, not fuch as have been long kept alive after they are caught, fhould be liberally ufed as food. The wines and tinctures of them can fcarce be fuppofed to receive any confiderable virtue from the animal. The dry flefh brought us from abroad is entirely infignificant.

VIRAGO, a woman of extraordinary ftature and courage; and who, with the female fex, has the mien and air of a man, and performs the actions and exercifes of men.

VIRGA, a yard. See the article YARD.

VIRGA is particularly ufed in law for a verge, or rod, fuch as fheriffs and bailiffs carry as a badge of their office. See the article VERGE.

VIRGA AUREA, in botany, the fame with folidago. See the article SOLIDAGO.

VIRGA SANGUINEA, in botany, the fame with the cornus. See CORNUS.

VIRGÆ, in phyfiology, a meteor called alfo columellæ and funes tentorii; being an affemblage of feveral ftreams of light, reprefenting a bundle of rods or ropes. It is fuppofed owing to the ftreaming of the fun's beams through certain rimulæ, or chinks, at leaft through the more lax and open parts of a watery cloud, happening chiefly in the morning and evening. There is alfo another kind, confifting not of ftreams of mere white light, but, as it were, painted of various colours like thofe of the rainbow.

VIRGIN, *virgo*, a female who has had no carnal commerce with man; or more properly, who has ftill the flos virginis, or maidenhead. In the antient chriftian church, there were a kind of religious order confifting of women who made open and public profeffion of virginity; and this before the monaftic life or name was ever known in the world. This appears from the writings of Cyprian and Tertullian, who fpeaks of virgins dedicating themfelves to Chrift before there were any monafteries to receive them. Thefe, for diftinction's fake, were fometimes called ecclefiaftical virgins and canonicæ, becaufe they were enrolled in the canon or matricula of the church. They differed from the monaftic virgins chiefly in this, that they lived privately in their fathers houfes, and in cafes of neceffity were maintained by the church; whereas the others lived in community and upon their own labour. Whether they made any folemn vow is not agreed on: and as to their confecration, it was ufually performed publicly in the church by the bifhop, or fome prefbyter deputed by him. See MONK, NUN, &c.

VIRGIN is alfo applied, by way of eminence, to Mary the mother of our Saviour, as conceiving and bringing him forth without any breach of her chaftity. Many of the antient fathers, with the modern churches, hold, that the virgin not only conceived but brought forth, or was delivered, without breach of her virginity; and it is even alledged, that fhe remained a virgin to the end of her life: though, as this is not recorded in holy writ, many have denied it, and held that fhe had afterwards to do with Jofeph, and bore other children.

*Purification*, &c. *of the holy* VIRGIN. See the article PURIFICATION.

VIRGIN is alfo applied figuratively to feve-

ral things that retain their abfolute purity, and have never been made ufe of. Thus virgin-wax is that which has never been wrought, but remains as it came out of the hive. Virgin-oil is that which oozes fpontaneoufly out of the olive, *&c.* without preffing. Virgin-gold, is that metal fuch as it is found pure in the mine, without any mixture of allay; in which ftate it is fometimes fo foft that it will take the impreffion of a feal. Virgin-copper is a native copper found in the mine, and which has never been melted down. Virgin-quickfilver is that found perfectly formed and fluid in the veins of mines; or at leaft fuch as is got from the mineral earth by mere lotion, without fire. Virgin-parchment is that made of the fkin of an abortive lamb, *&c.* See the articles WAX, OIL, *&c.*

VIRGIN'S-THREAD, a fort of meteor that flies in the air like fmall untwifted filk; which falling upon the ground, or upon plants, changes itfelf into a fubftance like a fpider's-web. In thefe northern climates it is moft frequent in fummer, the days being then temperately warm, the earth not exceeding dry, nor yet overcharged with moifture. This has formerly paffed for a fort of dew of an earthy flimy nature: but naturalifts are now agreed that the virgin's threads are no other than fo many fpider's-webs. See the article SPIDER'S-WEB.

VIRGIN'S-BOWER, in botany, the fame with clematis. See CLEMATIS.

VIRGIN ISLANDS, very fmall iflands of the Caribees, fituated in the Atlantic or American-ocean, a little to the eaftward of Porto-Rico.

VIRGINALE CLAUSTRUM, in anatomy, the fame with hymen. See HYMEN.

VIRGINIA, one of the Britifh American colonies, fituated between feventy-four and eighty degrees weft long. and between thirty-fix and thirty-nine degrees of north lat. bounded by the river Patowmack, which feparates it from Maryland, on the north; by the Atlantic-Ocean, on the eaft; by Carolina on the fouth; and may be extended as far weftward as we think fit.

VIRGINITY, *virginitas*, the teft or criterion of a virgin, or that which intitles her to the denomination. The phyficians, both antient and modern, are exceedingly divided upon the fubject of virginity, fome holding that there are no certain marks or teftimonies thereof, and others, that there are. Mofes eftablifhed a teft that was to be conclufive among the Jews. The nuptial fheets, it feems, were to be viewed by the relations on both fides, and the maid's parents were to preferve them as a token of her virginity, to be produced in cafe her hufband fhould ever reproach her on that fcore. In cafe the token of virginity was not found thereon, fhe was to be ftoned to death at her father's door. This teft of virginity has occafioned abundance of fpeculation about the parts concerned; but the niceft enquiries cannot fettle any thing certain about them. Dr. Drake fays exprefly, that whatever might be expected among the Jews, there is not the fame reafon to expect thofe tokens of virginity in thefe countries; for, befides that the Hebrews married extremely young, as is the cuftom in all the eaftern countries, there are feveral circumftances which may here fruftrate fuch expectations, even in virgins not vitiated, either by any male contact, or any wantonnefs of their own. In effect, in thefe northern countries, the inclemency of the air expofes the fex to fuch checks of perfpiration, as gives a great turn to the courfe of the humours, and drives fo much humidity through the parts, as may extraordinarily fupple and relax thofe membranes from which the refiftance is expected, and from which, in hotter countries, it might more reafonably be depended on.

What moft commonly paffes among us for a teft of virginity, is the hymen; and yet the moft curious among the anatomifts are greatly divided, not only about the figure, fubftance, place, and perforations of this membrane, but even about the exiftence thereof; fome pofitively affirming, and others as flatly denying it. See the article HYMEN.

VIRGO, in aftronomy, one of the figns or conftellations of the zodiac, and the fixth according to order. See ZODIAC. It is marked thus ♍, and in Ptolemy's catalogue confifts of 32 ftars, in Tycho's of 39, and in the Britannic of 89.

VIRGULA DIVINA, or BACULUS DIVINATORIUS, *&c.* a forked branch, in the form of a Y, cut off an hazel-ftick, by means whereof people have pretended to difcover mines, fprings, *&c.* under ground. The method of ufing it is thus: the perfon who bears it, walking very flowly over the places where he fufpects mines or fprings may be, the effluvia exhaling from the metals, or vapour from the water, impregnating the wood,

makes it dip or incline, which is the ſign of a diſcovery. Some diſpute the matter of fact, and deny it to be poſſible. Others, convinced by the great number of experiments alledged in its behalf, look out for the natural cauſes thereof: the corpuſcles, ſay thoſe authors, riſing from the ſprings or minerals, entering the rod, determine it to bow down, in order to render it parallel to the vertical lines which the effluvia deſcribe in their riſe.

VIRGULTUM, in our antient law-books, is uſed for a holt or plantation of twigs or oſiers.

VIRIDARIO ELIGENDO, a writ that lies for the choice of a verderor. See the article VERDEROR.

VIRILE, ſomething that belongs or is peculiar to a man, or the male ſex: thus the virile member is uſed for the penis; virile age, the ſtrength and vigour of a man's age, *viz.* from thirty to forty-five years, being the age wherein we are equally removed from the extremes of youth and of old age.

VIRILIA, a man's genitals, or privy members, including the penis and teſtes. See the articles PENIS and TESTES.

VIRTSUNGIANUS DUCTUS, in anatomy, a canal uſually called ductus pancreaticus. See the article PANCREAS.

VIRTUAL, or POTENTIAL, ſomething that has a power or virtue of acting or doing. The term is chiefly underſtood of ſomething that acts by a ſecret inviſible cauſe, in oppoſition to actual and ſenſible.

VIRTUAL FOCUS, in optics. See FOCUS.

VIRTUALITY, in the ſchools, denotes ſome mode or analogy in an object, which, in reality, is the ſame with ſome other mode, but, out of regard to contradictory predicates, is conſidered as if diſtinct therefrom.

VIRTUALLY, in the ſchools, is applied to a mode of exiſtence. A thing is ſaid to be virtually any where, when it is deemed to be there by ſome virtue, influence, or other effect, produced by it: thus the ſun is virtually on earth, *i. e.* by his light, heat, &c. A thing is alſo ſaid to be virtually preſent, when the virtues or properties belonging to it, and iſſuing from it, remain: in which ſenſe the forms of the elements are held to be virtually in mixed bodies. A thing is ſaid to be a cauſe virtually, or a virtual cauſe, and that two ways; the firſt, when there is no real diſtinction between it, and the effect attributed to it, and yet it is conceived by us as if it were really the cauſe thereof: thus immutability in God is the cauſe of eternity. Secondly, when an effect is not of the ſame kind with the cauſe, and yet the cauſe has the power or virtue of producing the effect: thus the ſun is not formally but virtually hot; and the fire is not contained formally but virtually in heat.

VIRTUE, *virtus*, a term uſed in various ſignifications. In the general it denotes power, or perfection of any thing, whether natural or ſupernatural, animate or inanimate, eſſential or acceſſary. But in its more proper or reſtrained ſenſe, virtue ſignifies an habit, which improves and perfects the poſſeſſor and his actions. See the article HABIT, &c.

In this ſenſe virtue is a principle of acting or doing well and readily, and that either infuſed from above, ſuch as are the theological virtues; or acquired by our own application, as the intellectual or moral virtues.

For as there are two things in man, from which all his actions proceed, *viz.* the underſtanding and the will; ſo the virtue by which he is perfected, or whereby he is diſpoſed to do all things rightly, and to live happily, muſt be twofold: the one of the underſtanding, and the other of the will. That which improves the underſtanding is called intellectual, or dianoetic; and that, the will, moral and ethic; for ſince there are two things required, in order to live aright, *viz.* to know what ſhould be done; and, when known, readily to perform it; and ſince man is apt to err various ways in each reſpect, unleſs regulated by diſcipline, &c. he alone can deport himſelf rightly in his whole courſe of life, whoſe underſtanding and will have attained their utmoſt perfection. See UNDERSTANDING, WILL, ETHICS, MORALITY, &c.

Intellectual virtue, then, according to Ariſtotle, is an habit of the reaſonable ſoul, whereby it conceives or ſpeaks the truth, either in affirming or denying. The virtues which come under this claſs are divided into ſpeculative, which are thoſe converſant about neceſſary things, that can only be known or contemplated; and practical, which are converſant about contingent things, that may likewiſe be practiſed. Ariſtotle has another diviſion of intellectual virtues, fetched from the ſubject, as ſome of them are ſeated in the contemplative part, *viz.* thoſe converſant about neceſſary things, as ſcience, wiſ-

 dom,

dom, intelligence; and others in the practical part, such are those conversant about contingent things, as prudence, art, &c. See the article SCIENCE, &c.

Moral virtue is defined, by Aristotle, to be an elective habit, placed in a mediocrity, determined by reason, and as a prudent man would determine. Moralists usually distinguish four principal, or, as they are vulgarly called, cardinal virtues, *viz.* prudence, justice, fortitude, and temperance: the reason of which division is founded in this, that for a man to live virtuously and honestly, it is necessary he know what is fit to be done, which is the business of prudence: that he have a constant and firm will to do what he judges best; which will perfect the man, either as it restrains too violent perturbations, the office of temperance; or as it spurs and urges on those that are too slow and languid, which is the business of fortitude; or, lastly, comparatively with regard to human society, which is the object of justice. To these four virtues all the rest are referred, either as parts, or concomitants. See the articles PRUDENCE, JUSTICE, &c.

VIRTUES, in the celestial hierarchy, the third rank or choir of angels, being that in order between the dominations and powers: to these is attributed the power of working miracles, and of strengthening and reinforcing the inferior angels in the exercise of their functions.

VIRTUOSO, an italian term, lately introduced into english, signifying a man of curiosity and learning, or one who loves and promotes the arts and sciences: but among us the term seems to be appropriated to those who apply themselves to some curious and quaint, rather than immediately useful, art or study, as antiquaries, collectors of rarities of any kind, microscopical observers, &c.

VIRULENT, a term applied to any thing that yields a virus, that is, a contagious or malignant pus. For the virulent gonorrhoea, see the article GONORRHOEA.

VIS, a latin word, signifying force or power; adopted by physical writers to express divers kinds of natural powers or faculties. For the vis inertiæ, see the article INERTIÆ, &c.

Vis impressa is defined, by Sir Isaac Newton, to be the action exercised on any body, to change its state, either in resisting or moving uniformly in a right line. This force consists altogether in the action, and has no place in the body, after the action is ceased. See the articles PERCUSSION, MOTION, RESISTANCE, PRESSION, CENTRIPETAL, &c.

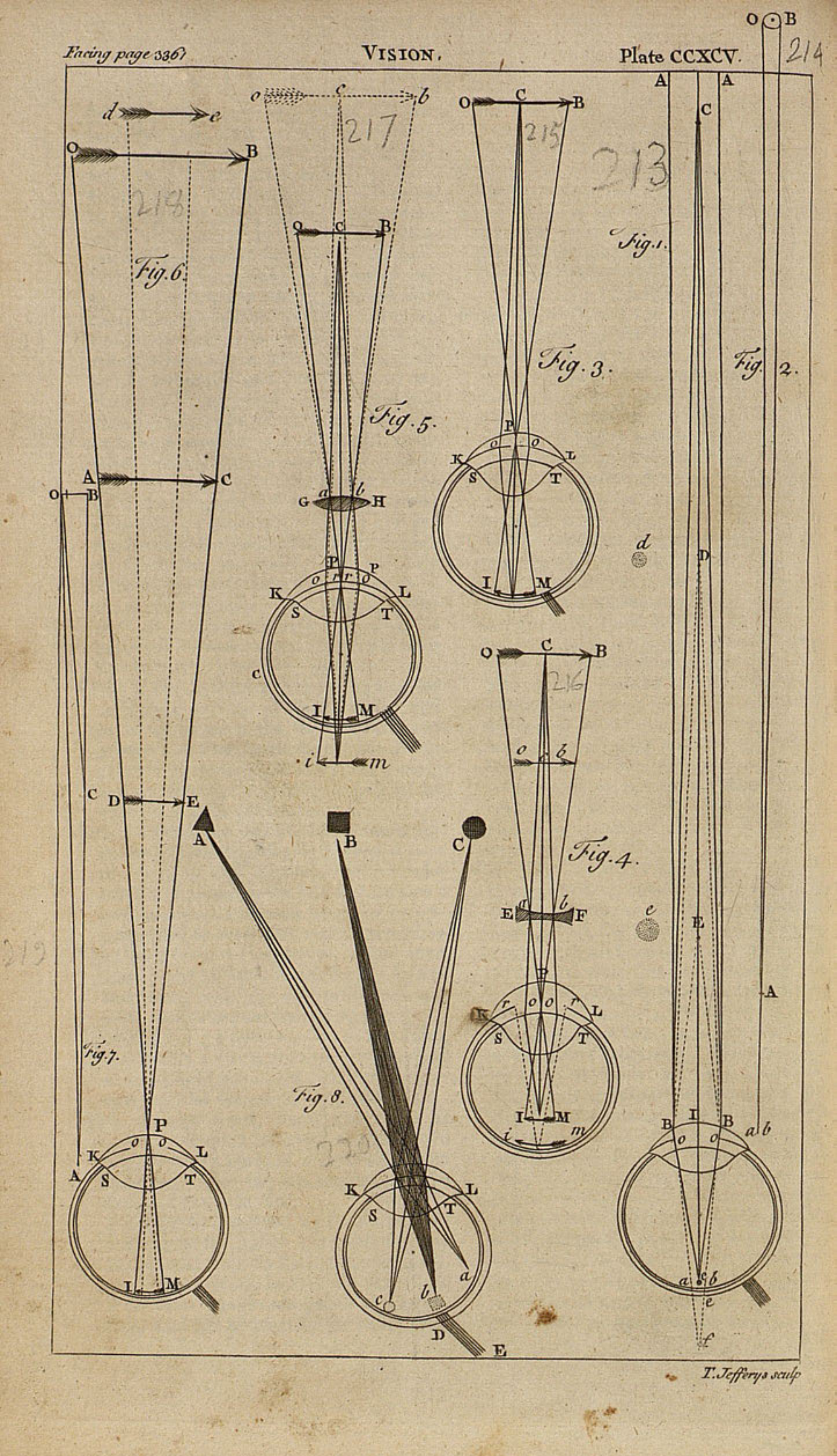
VISCAGO, in botany, the same with silene. See the article SILENE.

VISCERA, in anatomy, a term signifying the same with entrails, including the heart, liver, lungs, spleen, intestines, and other inward parts of the body. See the articles HEART, LIVER, &c.

*Wounds of the* VISCERA. If any of the viscera situated in the abdomen, as the liver, spleen, or kidney, has received a wound from a sharp instrument, at the first dressing the wound must be filled as tenderly as possible with lint well saturated with highly rectified spirit of wine, or spirit of turpentine, securing the dressings with compresses and a bandage; by this means the hæmorrhage will be stopped, if no large vessel is divided. When this part is gained, the wound must be treated in the common manner, and the patient kept very low; bleeding him, if of a plethoric habit, and giving daily two or three doses of Locatellus's balsam; for balsams of this kind are of great service in healing internal wounds. This is the method to be taken with wounds of the viscera, which may be discovered by the eye or touch. But in such of them as are hidden, and not to be thus discovered, all that can be done is to inject vulnerary decoctions, and keep a passage open for the evacuation of sordes, or grumous blood. See the article WOUND, &c.

VISCIDITY, or VISCOSITY, the quality of something that is viscid or viscous, that is, glutinous and sticky, like birdlime, which the Latins call by the name *viscus.* Viscid bodies are those which consist of parts so implicated within each other, that they resist a long time a complete separation; and rather give way to the violence done them, by stretching or extending every way. The too great viscidity of foods has very ill effects; thus meats or farinæ not fermented, gellies, &c. of animals, tough cheese, or curds too much pressed, produce a weight or oppression in the stomach, wind, yawnings, crudities, obstructions of the minuter vessels in the intestines, &c. Hence an inactivity of the intestines themselves, a swelling of the abdomen; and hence a viscidity of the blood, from the re-union of the viscid particles; obstructions of the glands; paleness, coldness, tremors, &c.

VISCOUNT. See VICOUNT.


Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
T. Jefferys sculp

VISCUM, MISLETOE, in botany, a genus of the dioecia-tetrandria clafs of plants, having no corolla; the fruit is a round fmooth berry, containing one cell, wherein is a fingle carnofe feed, obtufe, compreffed, and obverfely cordated.

This plant was held in veneration by the fuperftition of former ages: it was hung about the neck, to prevent witchcraft; and taken internally to expel poifons. Of late times it has been celebrated as a fpecific in epilepfies, palfies, &c. virtues which it were greatly to be wifhed that experience gave any countenance to.

VISET, a town of the auftrian Netherlands, in the province of Limburg, fituated on the eaft fhore of the river Maes, feven miles north of Liege.

VISIAPOUR, a city of the hither peninfula of India, in the province of Decan, fituated one hundred and thirty miles north-eaft of Goa: eaft long. 75°, and north lat. 16° 45′.

VISIBLE, fomething that is an object of fight or vifion, or fomething whereby the eye is affected, fo as to produce a fenfation. See the articles VISION, SIGHT, EYE, &c.

VISIER, or VIZIER, an officer or dignitary in the ottoman empire, whereof there are two kinds; the firft, called by the Turks vifier-azem, that is, grand vifier, is the prime minifter of ftate of the whole empire. He commands the army in chief, and prefides in the divan or great council. Next to him are fix other fubordinate vifiers, called vifiers of the bench, who officiate as his counfellors, or affeffors in the divan.

VISION, *vifio*, in optics, the act of feeing or perceiving external objects, by means of the organ of fight, the eye. See the article EYE.

Such is the fubftance and form of the humours of the eye, when lodged in their proper receptacles, that rays of light, in paffing through them, are affected in like manner as in paffing through a convex lens; and therefore, to underftand perfectly the nature of vifion, we muft firft be acquainted with the doctrine of light and lenfes. See LIGHT and LENS.

Now as the feveral pencils of rays flowing from the diftinct points in the furface of an object placed before a lens, are collected into fo many points at a certain diftance, on the other fide of the lens, and form an image there, when received upon white paper; fo pencils of rays proceeding from an object placed before the eye, at a proper diftance from it, and being refracted in paffing through the humours of it, are collected into their refpective foci upon the retina, where they form a reprefentation of that object; and by their impulfes upon the tender nerves of the retina, an idea of the object is excited in the mind. See REFRACTION.

Vifion is diftinguifhed into bright and obfcure, diftinct and confufed. It is faid to be bright, when a fufficient number of rays enter the pupil at the fame time; and obfcure, when too few: it is called diftinct, when each pencil of rays is collected into a focus, exactly upon the retina; and confufed, when they meet before they come at it, or when they would pafs it before they meet.

Now fince parallel rays only have their focus upon, or meet in, the retina, they alone can paint there a diftinct image of an object, or produce a diftinct vifion of it. If, therefore, the object be fo near, that the rays from any particular point come diverging to the pupil, they will neceffarily require a greater focal diftance than the retina, or bottom of the eye; whence the rays not being united upon the retina, that point cannot be there diftinctly reprefented, but will appear confufed: thus, AB, AB (plate CCXCV. fig. 1.) are two parallel rays falling upon the pupil of the eye; and CB, CB, two other rays, which, though really diverging, yet, by reafon of the remotenefs of the point C, whence they proceed, will at the entrance of the eye be fo nearly coincident with the parallel rays, as to have nearly the fame focal point on the retina, fo that the point C will there be diftinctly reprefented by *c*. But if any other point E, be viewed very near the eye, fo that the angles EBA, which they contain with the parallel rays, be very confiderable, they will, after refraction, tend towards the point *f*, in the axis of the eye produced, and upon the retina will reprefent only a circular indiftinct area; like that at *e*, whofe breadth is equal to *ab*, the diftance of the rays upon the retina. The fame point at D, will not be quite fo much dilated, as the rays DB, DB, have a lefs degree of divergence.

It is found by experience, that the neareft limit of diftinct vifion is about fix inches from the eye; for if a book be held nearer to the eye than that, the letters and lines will immediately become confufed and indiftinct. Now this caufe of indiftinct

diftinct vifion may be in fome meafure remedied, by leffening the pupils, which we naturally do in looking at near objects, by contracting the annular fibres of the uvea; and artificially, by looking through a fmall hole made with a pin in a card, &c. for then a fmall print may be read much nearer than otherwife: the reafon is plain, for the lefs the diameter of the aperture or pupil B B, the lefs will the rays diverge in coming from D or E, or the more nearly will they coincide with parallel rays.

Befides the contraction of the pupil, nature has furnifhed the eye with a faculty of adapting the conformation of the feveral parts to the refpective pofitions of objects, as they are nigh or more remote; for this purpofe, the cornea is of an elaftic yielding fubftance, and the cryftalline is inclofed with a little water in its capfula, that by the contraction and relaxation of the ciliary ligament, the convexity of both the furfaces of the capfula may be a little altered, and perhaps the pofition of the cryftalline; by which means the diftance from the retina may be fitted and adjufted to nigh objects, fo as to have their images very diftinctly formed upon the retina.

Nigh objects only have been mentioned (by which are meant fuch as are near the limit of diftinct vifion, as between fix and a hundred inches diftance) becaufe objects more remote require fcarce any change of the conformation of the eye; the focal diftance in them varying fo very little. Thus, fuppofe all the refraction of the eye were equivalent to that of a double and equally convex lens, whofe radius $r=1$ inch: if then the object were 10 inches diftant, or $d=10$, we fhould have the focal diftance $f=\frac{dr}{d-r}=\frac{10}{9}=0.11111$; and if another object be diftant 100 inches, then $d=100$, and $f=\frac{dr}{d-r}=\frac{100}{99}=0.10101$. The difference between thefe two focal diftances is 0.0101, *viz.* the hundredth part of an inch, which the eye can eafily provide againft. If we go beyond this, fuppofe to an object 1000 inches diftant, we have $f=\frac{dr}{d-r}=0.1001001$, which is only the thoufandth part of an inch lefs than the former, and is therefore inconfiderable.

Now rays proceeding from any point more than 6 inches diftant from the eye, will, when they enter the pupil, be very nearly coincident with parallel rays; and therefore, to a found eye, diftinct vifion cannot be effected at lefs than 6 or 8 inches diftance, as may be found by any one who will make the experiment. Six inches, therefore, conftitutes the limit of diftinct vifion, for near objects: we fhall now confider the limit for remote objects; for objects may appear indiftinct and confufed, by being removed too far from the eye, as well as when they are too near it. And in this cafe we find objects will appear diftinct fo long as their parts are feparate and diftinct in the image formed on the retina; and thofe parts will be feparate fo long as the axis of the pencils of rays, which paint them, are feparate at their incidence on the retina; that is, fo long as the angle they contain is not lefs than one tenth of a degree: for it is found, by experience, that objects and their parts become indiftinct, when the angle they fubtend at the pupil of the eye is lefs than that quantity.

Thus, fuppofe O B (*ibid.* fig. 2.) to be a circle one tenth of an inch in diameter, it will appear diftinct with its central fpot, till you recede to the diftance of 6 feet from it, and then it becomes confufed; and if it be one fifth of an inch, it will begin to be confufed at 12 feet diftance, and fo on: in which cafes the angle fubtended at the eye, *viz.* O A B, is about one tenth of a degree, or 6 minutes. And thus all objects, as they are bigger, appear diftinct at a greater diftance; a fmall print will become confufed at a lefs diftance than a larger; and in a map of England, the names of places in fmall letters become firft indiftinct, where thofe in capitals are very plain and legible; at a bigger diftance thefe become confufed, while the feveral counties appear well defined to a much greater diftance: thefe alfo at laft become fo indiftinct as not to be known one from another, when at the fame time the whole ifland preferves its form very diftinctly, to a very great diftance; which may be fo far increafed, that it alfo, at laft, will appear but a confufed and unmeaning fpot.

We have feen the caufes of indiftinct vifion in the objects, and fhall now enquire what may produce the fame in the eye itfelf. And firft it is to be obferved, that there is a proper degree of convexity in the cornea K P L (*ibid.* fig. 3.) and cryftalline S T, for converging parallel rays to

to a focus on the bottom of the eye, in a found ftate; hence every diftant object OB, will have its image IM, accurately depicted on the retina, and by that means produce diftinct vifion.

But if the cornea KPL (*ibid.* fig. 4.) or cryftalline ST, or both, fhould chance to be a little more convex than juft, it will caufe the pencil of rays *o*C*o*, which comes to the pupil *oo*, from any point C in the object OB, to unite in a focus before they arrive at the retina in the bottom of the eye; the image IM, of the object OB, will be formed in the body of the vitreous humour, and will therefore be very confufed and indiftinct on the retina at *im*. A perfon having fuch an eye, is called myops, in allufion to the eye of a moufe, by reafon of its great convexity. To remedy this defect of the eye, a concave lens EF, is applied before it; for by this means the rays C*a*, C*b*, which fall diverging on the lens, will, after reflection through it, be made to proceed ftill more diverging, *viz.* in the directions *ar*, *br* (inftead of *ao*, *bo*) as if they came from the point *c*, inftead of C. Hence it follows, that fince the rays are made to fall with greater divergence upon the eye, they will require a greater focal diftance to be united in the axis; and, confequently, the focus may be made to fall very nicely on the retina, by ufing a lens EF, of a proper degree of concavity; fo that diftinct vifion will be effected, in the fame manner as in an eye of a juft conformation.

Since the point *c*, is nearer to the eye than the point C, the apparent place of objects feen through a concave lens is nearer than the true place; or the object will appear at *OB*, inftead of OB; and alfo, fince converging rays O*a*, B*b*, proceed lefs converging after refraction than before, the object appears under a lefs angle; and, therefore, the apparent magnitude of objects, feen by a concave lens, is lefs than the true: the object is alfo lefs luminous, or bright, feen thro' fuch a lens, than without it; becaufe the rays being rendered more divergent, a lefs quantity enters the pupil of the eye, than otherwife would do: for the picture is always more or lefs bright, according as it is made by a greater or lefs quantity of rays. Laftly, it appears from what has been faid, that when a concave lens EF, cannot be applied, we may ftill effect diftinct vifion, by leffening the diftance between the object and the eye: for it is plain, if OB be fituated at *OB*, the image at IM, will recede to *im*, upon the retina, and be diftinct, in the fame manner as when made fo by the lens EF.

On the other hand, when the cornea or cryftalline is too flat, &c. (as often happens by age) an object OB (*ib.* fig. 5.) placed at the fame diftance from the eye PC, as before, will have the rays C*o*, C*o*, after refraction in the eye, proceed to a focus beyond the bottom of the eye, in which, if a hole were made (in an eye taken out of the head) the rays would actually go on, and form the image *im*; which image muft, therefore, be very confufed and indiftinct on the retina. To remedy this defect, a convex lens GH, is applied, which caufes the diverging rays C*a*, C*b*, to fall lefs diverging upon the eye, or as if they came from a point more remote, as *c*; by which means the focal diftance is fhortened, and the image duly formed on the retina at IM, by which diftinct vifion is produced.

Hence the apparent place of the object at *c*, is more diftant than the true place is at C; and its apparent magnitude *OB* is greater than the true, becaufe the converging rays O*a*, B*b*, are by this lens after refraction made to unite fooner than before, and fo to contain an angle *OPB* greater than the true OPB. The object appears through a convex lens brighter than without, becaufe by this means a greater quantity of rays enter the pupil; for the rays *ao*, *bo*, are by the lens made to enter in the directions *ar*, *br*, which are nearer together, and leave room for more to enter the pupil all around between *o* and *r*.

As the image of the object painted on the retina is greater or lefs, fo will the apparent magnitude of the object be likewife; or, in other words, the angle IPM (*ibid.* fig. 6.) fubtended by the image is always equal to the angle OPB fubtended by the object at the eye, and therefore the image IM will be always proportional to the object OB. Hence it follows, that the angle OPB under which an object appears, is the meafure of its apparent magnitude.

Therefore objects of different magnitudes, as OB, AC, DE, which fubtend the fame angle at the eye, have the fame apparent magnitude, or form an equal image in the bottom of the eye. Hence it is that objects at a great diftance have their magnitude diminifhed proportion-

portionally: thus the object DE removed to *DE* appears under a less angle *DPE*, and makes a less image on the retina, as is shewn by the dotted lines.

The angles of apparent magnitude OAB, OCB, (*ibid.* fig. 7.) when very small, are as their sines, and therefore as the sides OC and OA, or BC and BA; that is, the apparent magnitude of the object OB, at the distances BC and BA, is inversely as those distances; or its magnitude at C is to that at A as AB to CB.

The more directly any object is situated before the eye, the more distinctly it will appear; because those rays only which fall upon the eye near its axis can be convened to a point in the bottom of the eye on the retina, and therefore that part of the image only which is formed by the direct pencil of rays can be clear and distinct; and we are said to see an object by such a pencil of rays, but only to look at it by the others which are oblique. Suppose A, B, C, (*ibid.* fig. 8.) represent three pieces of paper stuck up against the wainscot of a room at the height of the eye; if then a person places himself so before them, and shutting his right eye views them with his left, it is very remarkable that the paper B, whose pencil of rays falls upon the insertion D of the optic nerve DE, will immediately vanish or disappear, while the two extreme papers C and A are visible; and by altering the position of the eye, and its distance, any of the papers may be made to vanish, by causing the pencil of rays to fall on the point D. Why the rays of light should not excite the sensation of vision in the point D, where the fibres of the nerves begin to separate and expand every way to form the retina, is not easy to say. But it is worth notice, that the nerve DE is for that reason placed on one side of the eye, where only the oblique rays come, the loss of which is not considerable, and no way affects or hinders the perfection of sight: whereas had it entered in the middle of the bottom of the eye, it had rendered useless all the direct rays, by which the most perfect and distinct vision is effected; and we could have had only a confused and imperfect conception of objects, by oblique collateral rays.

The laws of vision, brought under mathematical demonstration, make the subject of optics, taken in the greatest latitude of the word; which is commonly used, in a more restrained sense, for the doctrine of direct or simple vision, performed by rays passing directly, or in a straight line, from the object to the eye. The doctrine of reflected vision, or that performed by means of rays reflected from mirrours, makes the subject of catoptrics; and refracted vision, or that performed by rays refracted through glass lenses, or other mediums, constitutes that branch of optics, called dioptrics. See the articles OPTICS, DIOPTRICS, CATOPTRICS, LENS, MIRROUR, REFLECTION, and REFRACTION.

VISION, among divines, an appearance which God occasionally sent his prophets and saints, either by way of dream, or reality: such were the visions of Ezekiel, Amos, St. Paul, *&c.*

*Beatific* VISION, denotes the act whereby the angels and blessed spirits see God in Paradise.

VISITATION, in law, an act of jurisdiction, whereby a superior, or proper officer, visits some corporation, college, church, or other public or private house, to see that the laws and regulations thereof be duely observed.

Among us, visitation is that office performed by the bishop in every diocese once in three years, or by the archdeacon every year, by visiting the churches and their rectors throughout the whole diocese, *&c.* The bishop's commissary also holds a court of visitation, to which he may cite all church-wardens and sidesmen; and to whom he exhibits his articles, and makes inquiry by them.

VISMATHUM, BISMUTH, in natural history. See the article BISMUTH.

VISNE, *visnetum*, in law-books, signifies a neighbouring place, or place near at hand.

VISTULA, or WEISEL, a large river of Poland, which, taking its rise in the mountains south of Silesia, visits Cracow, Warsaw, *&c.* and continuing its course north, falls into the Baltic Sea below Dantzick.

VISUAL, in general, something belonging to vision. See the article VISION.

Thus, rays of light, coming from an object to the eye, are called visual rays; and the visual point in perspective is a point in the horizontal line, wherein all the visual rays unite. See the articles RAY and PERSPECTIVE.

VITAL, in physiology, an appellation given to whatever ministers principally to the constituting or maintaining of life

life in the bodies of animals: thus, the heart, lungs, and brain are called vital parts; and thoſe operations of theſe parts, whereby the life of animals is maintained, are called vital functions. See the article FUNCTION.

VITERBO, a city of Italy, twenty-five miles north of Rome.

VITEX, the CHASTE-TREE, in botany, a genus of the didynamia-angioſpermia claſs of plants, with a monopetalous, ringent, and bilabiated flower, each lip of which is trifid; the fruit is a quadrilocular, globoſe berry; containing four ſeeds. See the article AGNUS CASTUS.

VITIS, the VINE, in botany, &c. See the article VINE.

VITIS IDÆA, in botany, a ſpecies of vaccinium. See the article VACCINIUM.

VITREOUS *humour of the eye*, is ſo called from its reſemblance to glaſs in fuſion, being very like a fine clear jelly in appearance: it probably, ſays Heiſter, conſiſts of extremely fine veſicles, containing a limpid and perfectly pellucid humour. It fills the poſterior part of the eye, and is every where contiguous to the hinder part of the retina, which it ſerves alſo to expand. See EYE.

VITRIFICATION, in chemiſtry, is the converting a body into glaſs, by means of fire. See the article GLASS.

Of all bodies, fern-aſhes, ſand, pebbles, &c. vitrify the moſt readily; and accordingly, it is of theſe that glaſs is principally made.

VITRIOL, in natural hiſtory, a compound body formed of the particles of metals diſſolved by the acid of ſulphur, and that either by the operations of nature, within the earth, or in the chemiſts elaboratory by proper admixtures and aſſiſtances; and afterwards, by the help of water, brought into the form of a ſalt.

The vitriols, therefore, very much approach the nature of metals, and, in ſome inſtances, are found to have taken up other ſubſtances, particularly, ſome of the ſemi-metals among them, as, the white-vitriol, which contains zink. See the article ZINK.

The other metals we find diſſolved in this manner in the bowels of the earth, and there formed into vitriols, are iron and copper. Theſe, therefore, are the great baſis of thoſe ſalts; and according as they belong to one or the other of them, are to be divided into the cupreous and the ferrugineous vitriols.

The naturaliſt, who collects for his amuſement, will meet with vitriols containing theſe two metals, in various proportions, in the ſame maſs. The blue-green vitriol of Hungary and Tranſylvania, and many other of the foſſils of this claſs are of that kind.

We ſhall here only conſider thoſe vitriols fit for the uſe of medicine, and, therefore, treat of the diſtinct and determinate vitriols which contain only the particles of one of theſe metals. Of theſe there are but three kinds, *viz.* 1. Green vitriol. 2. White vitriol. 3. Blue vitriol. To theſe, however, we are to ſubjoin the vitriolic minerals, miſy, ſory, melantina, &c. which are all of them, properly, the ores of vitriols. See MISY, SORY, &c.

1. Green vitriol has iron wholly for its baſis. It is formed ſolely of that metal, diſſolved by the acid of ſulphur, and by means of water reduced to the form of ſalt. It is of two kinds, natural and factitious; the natural or native kind is known by the name of green vitriol; the common appellation of the other is copperas. See the article COPPERAS.

It is a tolerable pure and pellucid ſalt, of a compact and regular texture, conſiderably heavy, but friable, and eaſily ſhattering to pieces on the ſmalleſt blow. It is of a fine, pale, graſs-green colour. It will not melt, or wholly run to water in a damp air, but it is very apt to be moiſt on the ſurface; it very readily diſſolves in water, and after evaporation, freely ſhoots again into regular cryſtals, the true figure of which is a thick rhomboid; but they are ſeldom perfect or regular. Expoſed to the fire, it becomes thin like water, boiling and bubbling up, and emitting a very thick fume. After this it grows thicker, and, finally, calcines to a grey powder; and from this, if the fire be continued and made more violent, to a fine purple matter, called colcothar of vitriol. See COLCOTHAR.

In England, where the greateſt quantity of this vitriol is made, it is formed from the common greeniſh pyrites, with the addition of old iron. The people who collect theſe pyrites, are not at the pains of ſearching it among the ſtrata, but they pick it up on the ſea coaſts of Eſſex, and other places, under cliffs, compoſed of ſtrata of clay, out of which the ſea waſhes it, and leaves it on the ſhore. This pyrites they expoſe to the air in vaſt heaps, and, in conſequence of that, it by degrees begins to ſwell and burſt, and ſhoot out in ſalts. They pile up theſe heaps in a kind of

pits lined with clay, now and then turning them when their falt begins to appear in a downy efflorefcence on the furfaces of the pieces they fall into, on breaking; the time of making vitriol being near. Thefe efflorefcences diffolve by the rains and dews, and are, in fine, converted into an acrid liquor, which is conveyed from the bottom of the pits into leaden boilers, into which a quantity of old iron is alfo thrown; the fire is made under thefe, and the liquor is kept boiling for three days, or more, and is all the time fupplied with frefh parcels of iron, fo long as it will act upon them. The old iron, picked up by the poor people about our ftreets, is fold to the vitriol or copperas makers with this intent. When the liquor is boiled to a proper confiftence, it is let out into large coolers, in which there are fticks placed acrofs, to which, as well as to the fides of the veffel, the vitriol adheres in large cryftals, of the form and texture above defcribed.

This falt, on a chemical analyfis, affords a very ftrong acid fpirit; or, as it is ufually, though very improperly, called, oil, which is a folvent for many of the metals, and effervefces very violently with an alkali, and even with fpirit of wine, or common water. Mixed with fal armoniac, it ferments violently, but the fermentation is attended with great coldnefs, inftead of the heat ufual on thefe occafions; and what is very fingular is, that, while the fermenting mixture itfelf is thus cold, the vapour that arifes from it is evidently hot to the hand. After the diftillation of this acid liquor of vitriol, what remains in the retort is a red earth called colcothar; it contains iron, and is a ftrong aftringent. See the article ALKALI.

In medicine, this fpirit is given internally in fevers, and hæmorrhages, and particularly in malignant fevers of the petechial kind; to be taken in all the drink, in fuch quantity as to give an agreeable acidity to it.

Vitriolated tartar is another very valuable medicine, prepared from green vitriols, which attenuates the humours, refifts putrefaction, and opens obftructions of the vifcera. See the article TARTAR.

2. White vitriol is a true and genuine, though not a pure, vitriol of iron; the colour of which, that has fo long perplexed the world to account for, is at length found to be owing to a mixture of zink in it.

The white vitriol, ufed in the fhops, is all prepared from the native falt of the fame name and colour, by folution and evaporation. It is a fafe, gentle, and expeditious vomit; being given in folution, from ten grains to a fcruple, or more: it is alfo ufed externally in collyriums, intended againft inflammations of the eyes; and is a very powerful ftyptic in injections to ftop the gleet that fometimes remains after the cure of a gonorrhœa. See GONORRHOEA.

3. Blue vitriol is a vitriol which has copper for its bafis. It is only met with fufpended in the waters of certain fprings, from which it is obtained by means of evaporation and cryftallization. The water of fuch fprings as are found ftrongly enough impregnated with copper to be worth the working for vitriol, is faved in refervoirs, and evaporated to a proper ftandard; after which it is let out into coolers, where it fhoots into the beautiful cryftals we fee; which have the fame qualities with the water, and on folution in common water, they make a ziment-water, not to be diftinguifhed from the native kind.

Blue vitriol is not given internally; but is of great ufe in external applications. The blue vitriolic water of the fhops is made by diffolving three ounces of blue vitriol, and two ounces of alum, in a pint and a half of boiling water; afterwards add two ounces of ftrong fpirit of oil of vitriol filtring the whole for ufe. It is an excellent ftyptic, and particularly ferviceable in hæmorrhages of the nofe. See the article HÆMORRHAGE.

VITRIOLATED, among chemifts, fomething that has vitriol infufed in it.

VITRIOLIC, an appellation given to whatever abounds with, or partakes of, the nature of vitriol: thus fuch foffil bodies as contain vitriol, are called vitriolic minerals, or ores of vitriol; as the pyrites, chalcitis, mify, fory, melanteria, marcafites, *&c.* See the articles PYRITES, CHALCITIS, *&c.*

VITRIOUS, or VITREOUS *humour of the eye*. See the article VITREOUS.

VITRY, a town of Champaign, in France, forty-fix miles fouth-eaft of Rheims.

VITTA, in anatomy, that part of the amnios, which fticks to an infant's head, when juft born. See AMNIOS.

VITUS's DANCE, *chorea fancti viti*, in medi-

medicine, a fort of convulfion, which boys and girls are fubject to, from the age of ten years, to the time of puberty: it difcovers itfelf firft by a kind of lamenefs, or an inftability of one of the legs, which they draw after them in a ridiculous manner; nor can they hold the arm of the fame fide ftill for a moment; and before they can bring a cup to their mouth, they ufe a thoufand odd gefticulations. In a convulfive paroxyfm, the limbs are ftrongly agitated; the hands are fometimes put behind them, and foon after they feem to be beating the air; and their legs will be drawn hither and thither, as if they were dancing fome antic dance. See the articles CONVULSION and SPASM.

Dr. Mead thinks this diforder to be rather paralytic than convulfive, and that it may be cured by the ufe of cold baths, and chalybeate medicines. Sydenham's method of cure is this: firft, take off feven or eight ounces of blood, more or lefs, according to the ftrength of the patient, from the arm; and the next day, let the patient take a gentle purge of rhubarb, fena, manna, &c. In the evening of the fame day, let him take a draught, with a fcruple of venice-treacle, and eight drops of liquid laudanum mixed in honey and milk-water. This purging and opiate draught is to be repeated at fome days diftance; the bleeding is alfo to be repeated to the fourth time; and in the intermediate days, a cordial and nervous electuary is to be given, compofed of the conferves of rofemary, orange-peel, and roman wormwood, with venice-treacle, candied nutmeg, and candied ginger; of this, the bignefs of a nutmeg may be given every morning and afternoon, drinking after it a decoction of piony, mafterwort, and elecampane, and angelica-roots, the leaves of rue, fage, betony, and other cephalic plants, with orange peel, and juniper-berries. Spirit of hartshorn may alfo be given every night in fmall dofes, in a nervous julep, and plafters of gum-caranna may be applied to the foles of the feet. According as the cure advances, the patient recovers the ufe of his hand and foot; and his amendment may always be difcovered by letting him attempt to bring a glafs of any liquor to his mouth in a ftrait line: tho' the bleeding fhould not be repeated beyond the fourth time, yet the alterative and purging medicines fhould be continued till the patient is quite well; and as people are fubject to relapfes in this diforder, it is proper to give the fame medicines, and to bleed at the return of that feafon of the year.

VIVA VOCE, a latin phrafe frequently ufed in englifh writers, and literally fignifying, by word of mouth.

VIVARY, in law books, a term indifferently ufed for a park, warren, or fifhpond. See the article PARK, &c.

VIVERRA, the FERRET, in zoology. See the article FERRET.

VIVIERS, a city of Languedoc, in France, fituated on the river Rhone, twenty miles north of Orange.

VIVIFICATION, in medicine, the art of vivifying; that is, of contributing to the action that gives life, or maintains life.

The chemifts, alfo, ufe the word in fpeaking of the new force, vigour, and luftre, which, by this art, they give to natural bodies; particularly to mercury, which, after having been fixed or amalgamated, they reftore to its firft ftate.

VIVIPAROUS, *viviparus*, in natural hiftory, an epithet applied to fuch animals as bring forth their young alive and perfect, in contradiftinction to them that lay eggs, which are called oviparous animals. See the article GENERATION.

The females of all the quadruped clafs are viviparous, and thofe of the bird-clafs are all oviparous. The laws of nature in the larger animals, are therefore, in a great meafure, fixed and certain; but it is not fo in the infect tribes, nor in the fifhes; for of thefe fome are viviparous, and others oviparous; and thofe of genera nearly allied to one another. Among infects, the much greater number are oviparous; but there are many which are not fo, as the pucerons, progallinfects, cochineal, &c. The millepedes and fcorpions are alfo well known to be fo; all the females of the butterfly, and of fome other claffes, lay only eggs: but the moft fingular and remarkable inconftancy in nature, if we may be allowed the expreffion, is that in the fly-kingdom; the fame clafs of infects, and even the fame genus, will furnifh us with fome which are viviparous, and others which are oviparous; the two-winged flies give us inftances of this: but thefe are not fingle in that refpect; for among the reptile world, there are other creatures which are fubject to the fame varieties; and Swammerdam has obferved a viviparous fnail. The two-winged viviparous flies bring forth worms

in all respects the same with those hatched from their eggs in the other species.

VIVO. in architecture, the shaft or fust of a column. See the article COLUMN.

The term is also used in a more particular sense for the naked of a column, or other part.

VIZIER, or VISIER. See VISIER.

UKRAIN, a province of Muscovy, lying northwards of Little Tartary, so called as being a frontier against Turky.

ULADISLAW, a city of Great Poland, situated on the river Boristhenes, eighty miles north-west of Warsaw: east long. 19°, and north lat. 53°.

ULCER, *ulcus*, in surgery, is a solution of the soft parts of our bodies, together with the skin, produced by some internal cause, as an inflammation, abscess, or acrimonious humours. But wounds which become inveterate, and even contusions, when difficult of cure, come within this definition, and pass, at length, into ulcers, and are commonly so called. See ABSCESS, WOUND, &c.

The proper and usual seat of an ulcer, then, is in any of the softer parts of the body, as the skin, fat, glands, flesh, and internal viscera. For if there be any exulceration or corrosion in the harder parts, as the bones, it comes rather under the notion of a caries, or what is commonly called spina ventosa, than that of an ulcer; though, on account of some kind of resemblance which it has with the ulcer, or erosion, of the softer parts, they are sometimes treated of in conjunction. See the article CARIES, &c.

Ulcers can by no means be reckoned all of one kind, but are distinguished into various species, on many accounts; as, 1. with respect to the different parts of the body in which they are seated; for, sometimes, they infest the skin, at other times the fat, and sometimes the glands and flesh. 2. As to their magnitude; for some ulcers are large and extended, others small, and contracted within narrow limits; some deep, others shallow and more superficial; in particular, ulcers of a considerable depth, but narrower, and more especially distinguished by the narrowness of their orifice or beginning, usually pass under the peculiar denomination sinus or fistula. Ulcers differ, 3. With regard to duration; for some are recent, others inveterate. 4. On account of their attendant symptoms; in which respect some ulcers are mild and favourable, others malignant, that is, attended with very acute pains, or fœtid, putrid, pinguious, rheumy, or discharging much ichor, creeping or spreading, cancerous, or inclining to a cancer, callous, fistulous, or verminous; there is a difference between them. 5. With respect to their causes, in which light they assume the epithets of scorbutic, venereal, carious, cancerous, pestilential, and such as are supposed to proceed from fascination. In the last place, ulcers are distinguished by the parts in which they are seated. Thus, some infest the nostrils, others, the fauces, palate, breasts, and anus; and one sort has the name of fistula lacrymalis. See the articles SINUS, FISTULA, &c.

The method of cure in ulcers is extremely various, as adapted to the great variety of the disease; for when the ulcer is but recent, it is to be healed in the same manner as a recent wound or abscess. We must first, then, begin with mundification, or cleansing the ulcer; after that proceed to incarn, or fill the cavity with new flesh; and, lastly, cover and conglutinate the same as much as possible, with a fair and even cicatrix.

Mundification of an ulcer is, according to Heister, usually performed in the following manner: first, the corrupted matter is evacuated; or, when it discharges itself not so freely as it ought, gently expressed with the fingers; if there be a deep sinus belonging to the ulcer, it is to be exterged by some proper injections; or, if the place be open enough, by repeating intromissions of fresh lint. If there be any pieces of membranes, or other corrupted pinguious parts, left in the ulcer, the best way to eject them is, at every dressing, to introduce into the place lint moistened with some digestive ointment, and cover it with a plaster of diachylon, diapalma, or something of the like nature; and upon that, apply compresses, and over the whole a bandage: this method is to be carefully followed till the place be thoroughly cleansed, or till the bottom of the ulcer appears quite red, and covered with new flesh.

After due mundification, the next business is to fill the ulcer with new flesh, which is performed by the help of such medicines as are commonly called sarcotics. The best and most effectual, by many degrees, is the digestive ointment; for without some extraordinary impediment, this digestive is, of itself, sufficient to produce new flesh. It is, indeed, the

the manner of almoſt all ſurgeons very gravely to recommend every one his proper balſamics for the procuring of new fleſh; but it is preſumed, there is no neceſſity for them to be ſo careful and ſolicitous in this point, ſince there is, in this very digeſtive, a balſamic virtue; and it ought, beſides, to be conſidered, that this new fleſh owes its generation, not ſo much to the aſſiſtance of medicines, as the benefit of nature: for all the care and diligence of the ſurgeon have ſcarce any other effect, than to remove all ſuch things as are hurtful, and may prove impediments to a cure. If any one, however, ſhould think this digeſtive ointment not ſtrong enough for his purpoſe, he may try balſam of arcæus, balſam of Peru, balſam of Mecca, balſam of ſulphur, eſſence of myrrh and aloes, oil of myrrh per deliquium, oil of eggs, and other vulnerary balſams of the like kind, which may be uſed in its ſtead; and, by the beſt means he can procure, to accompliſh a perfect conglutination.

When an ulcer has penetrated ſo deep as to have its bottom remote, not only from ſight, but from the reach of medicines, it may ſeem neceſſary in every dreſſing, after expreſſing the corrupted matter collected within, to make an injection of ſome cleanſing and healing liquor; ſuch as a decoction of agrimony and birthwort mixed with honey of roſes, or eſſence of myrrh and aloes, or what Bellofte, in his Hoſpital-ſurgeon, recommends, a decoction of walnut-leaves mixed with ſugar before the place be bound up, till the bottom is conglutinated, and to continue the ſame till the ulcer is filled up. See VULNERARY, &c.

The ulcer being, by ſome means or other, as may ſeem moſt adviſeable, incarned and filled up, the induction of a fit and decent cicatrix muſt be completed; but if by ſuch means you cannot prevent a luxuriancy of fleſh, with a moiſtneſs of the ulcer, it will be proper to ſprinkle on the part ſome drying powders, ſuch as thoſe of maſtic, frankincenſe, ſarcocolla, colophony, lapis calaminaris, and tutty; applying, afterwards, to the place dry lint, and a plaſter accommodated to retain and hold together all the things applied, continuing the ſame till the place be perfectly whole and ſound: but if the luxuriant and fungous fleſh has already elevated itſelf above the reſt, above the ſkin, the beſt way to conſume it, is to rub it with blue vitriol; or, if this be not ſtrong enough, to ſprinkle on it ſome powder of red precipitate and burnt alum, till its growth be entirely ſuppreſſed, and nothing appears prominent. See the articles FUNGUS and CICATRIX.

In the laſt place, it is hardly to be expreſſed how much a prudent regimen in diet and manner of living contributes towards the incarning and conglutination of ulcers: for it has been an old obſervation of the profeſſors of the ſalutary art, that very bad ulcers have been cured by means of a regimen, without any conſiderable aſſiſtance from medicine; and, on the contrary, that the ſlighteſt and moſt contemptible ſores have, by a neglect of the rules of diet, and prepoſterous way of living, degenerated into very bad, and even incurable, ulcers. See the article REGIMEN.

Great care, therefore, is to be taken by every perſon troubled with an ulcer, to avoid ſalt, acrid, and acid food, and ſuch as is too fat or heating, with ſwine's fleſh, and all ſuch as is difficult of concoction. If a bad habit of body be an impediment to the cure of an ulcer, the advice of a ſkilful phyſician is required, who, by the preſcription of proper internal medicines, may not only prevent an ulcer of a mild and favourable kind from becoming malignant, and perhaps incurable, but as much as poſſible promote and haſten its cure. See the article DIET.

In callous and fiſtulous ulcers, that have formed variety of ſinuſes, and when either nothing can be done by corroſive medicines, or elſe that they tear and corrode the nerves, and bring on convulſions, and other bad ſymptoms, before they affect the callus; in theſe caſes, the beſt and ſafeſt way is to lay open the ſinus, taking care not to wound the nerves, tendons, and arteries; and, after that, all the calluſes may be eaſily deſtroyed by the common methods. Or, if even this method ſhould not have the deſired effect, and if the patient has a conſiderable ſhare both of ſtrength and courage, and the ſituation of the nerves and arteries is favourable, the callous parts muſt be all either entirely cut out with the knife, or burned away by the actual cautery. See the article CALLUS.

When ulcers are attended with a large diſcharge, the acrimonious ſerum, wherewith the blood abounds, ſhould be evacuated by cathartic and diuretic medicines. Millepedes, in any form, are very pro-

properly prefcribed to be taken internally in thefe, as are alfo the effence of amber, myrrh, balfam of Peru, tincture of falt of tartar, tartarized tincture of antimony, and the like: large and frequent draughts of fmall liquors are frequently the caufe of thefe diforders, and are therefore moft carefully to be avoided; ftrong ale, or old wine, fhould be drank fparingly at meals, and nothing between them. Such meats are beft, on thefe occafions, as have feweft juices in them, and are very well roafted; and the external medicines muft be thofe which have the greateft reputation as dryers. The principal of thefe are lime-water, lapis calaminaris, tutty, chalk, maftic, francincenfe, colophony, and native cinnabar; and when any of thefe have been fprinkled in fine powder upon the ulcer, a plafter of diapompholygos, or the like, is to be laid over it.

For the cleanfing venereal ulcers, Heifter recommends the phagedenic water; or lime-water, impregnated with calomel: either of thefe may be applied often every day, and the parts may alfo, if neceffary, be touched with the cauftic; and when they are thoroughly cleanfed, they may very fuccefsfully be healed, either with an ointment made only of crude mercury mixed with turpentine, or with the following: take of the diapompholygos-ointment and crude mercury, killed with a fmall quantity of Venice-turpentine, of each equal quantities; mix them in a glafs-mortar into an ointment: or, take of the amalgama of lead and tin an ounce, of bole armenic two ounces; mix thefe, and make them into an ointment, by mixing with them a fufficient quantity of ointment of rofes, or any other fimple ointment, in a glafs-mortar. If there be at the fame time a caries of the bone, which is, indeed, too frequently the cafe, this is to be dreffed with euphorbium, oil of cloves, phagedenic-water, or fpirit of nitre with quick-filver diffolved in it; or, if it can conveniently and fafely be done, the actual cautery is of fignal fervice. See Pox, Bubo, *&c.*

ULCERATION, or Exulceration, in furgery, a little hole in the fkin, caufed by an ulcer. See the preceding article.

ULEX, in botany, a genus of the diadelphia-decandria clafs of plants, with a papilionaceous flower; and an oblong turgid pod for its fruit, containing a few roundifh and emarginated feeds.

This genus comprehends the genifta fpinofa, or furze-bufh, and the genifta fpartium of authors.

ULIERBECK, a town of Brabant, eleven miles fouth-eaft of Mechlin.

ULIGINOUS, in agriculture, an appellation given to a moift, moorifh, and fenny foil.

ULLAGE, in gauging, is fo much of a cafk, or other veffel, as it wants of being full. See the article Gauging.

The ullage of a veffel, whofe axis is parallel to the horizon, may be found thus: let AGBH (pl. CCXCVI. fig. 1. n° 1.) be the great circle in the middle of the cafk, whofe fegment G B H is filled with liquor, the fegment G A H being empty. The fegment G B H is known, if the depth EB be known, and E H a mean proportional between the fegments of the diameter A E and E B; all which are found by a rod or ruller put into the veffel. Let the bafis of the cafk, at a medium, be found; which fuppofe to be the circle CKDL (*ibid.* n° 2.) and let the fegment K C L be fimilar to the fegment G A H (which is either found by the rule of three, becaufe the circle A G B H: the circle C K D L :: the fegment G A H: the fegment K C L; or it may be found by the tables of fegments made by authors) and the product of this fegment, multiplied by the length of the cafk, will give the liquid content in the cafk; which being fubtracted from the whole content, leaves the ullage A G H.

ULM, an imperial city of Swabia, in Germany, ninety miles fouth-weft of Ratifbon: eaft long. 10°, north lat. 48° 24′.

ULMARIA, in botany, a fpecies of filipendula. See Filipendula.

ULMEN, a town of Germany, thirty miles north-eaft of Triers.

ULMUS, the elm, in botany, a genus of the pentandria digynia clafs of plants, without any corolla: the fruit is a large oval drupe, containing a fingle, roundifh, and flightly compreffed feed. See Elm.

ULNA, in anatomy, one of the bones of the fore-arm, reaching from the elbow to the wrift: it is big at its upper extremity, and grows gradually fmaller towards its lower end. See Skeleton.

This bone is longer than the radius, and has a motion of flexion and extenfion: at its upper extremity, it articulates with the os humeri and the crifta of the radius; and its lower extremity articulates with the carpus, as alfo with the radius by means of a crifta.

Ulna, an ell. See Ell and Measure.

UL-

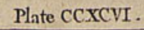



Fig. 1. ULLAGE

No. 1. A, B, G, E, H

No. 2. C, D, K, L

Fig. 2. Operation for the UNGUIS.

No. 1.

a

No. 2.

No. 3

Fig. 3. The White WAGTAIL.

Fig. 4. The WREN

Fig. 5. The UNICORN-FISH.

Fig. 6. The URANOSCOPUS.

T. Jefferys sculp.

ULNARIS, in anatomy, the name of two mufcles of the carpus, or hand; one called ulnaris internus, which is a flexor mufcle terminating in the internal officle of the carpus; and the other, called ulnaris externus, is an extenfor mufcle, terminating in the metacarpal bone that fupports the little finger.

ULSTER, the moft northern province of Ireland, the chief town of which is Londonderry.

ULTERIOR, in geography, is applied to fome part of a country or province, which, with regard to the reft of that country, is fituated on the farther fide of the river, mountain, or other boundary, which divides the country into two parts. Thus Africa, with regard to Europe, is divided, by mount Atlas, into citerior and ulterior, *i. e.* into two portions, the one on this fide mount Atlas, and the other on that.

ULTRAMARINE, *ultramarinum*, a beautiful blue colour ufed by the painters, prepared from lapis lazuli, by calcination. See the article LAZULI.

The german lapis lazuli does not anfwer well in this procefs, and difcovers itfelf by its calcining eafier than the African or Afiatic, and turning greenifh. The oriental kind calcines to a finer blue than it naturally has, and retains the colour for ever. After calcining the ftone in a clear fire of charcoal, they grind it to an impalpable powder on a porphyry, and then mixing it up in a pafte, compofed of pitch, wax, and oil, they work it about with the hands; and, finally, kneading this in a veffel of clear water, as the powder feparates from the vifcid matter, it finks to the bottom: when all that is perfectly fine in this is worked out, they let the water be drained off, and dry the powder for ufe. What remains embodied in the pafte, is afterwards feparated, and makes a worfe kind than the former; though even the very meaneft ultramarine is a very beautiful colour.

Ultramarine muft be chofen of an high colour, and well ground, which may be known by putting it between the teeth, and if it feel gritty, it is a fign it has not been well ground.

To know whether it be pure and unmixed, put a little of it into a crucible, and fo heat it red-hot; and if the powder has not changed its colour after this trial, it is certainly pure; on the contrary, if there be any change, or any black fpecks in it, then it has been adulterated.

There is alfo a fpurious fort, called common or dutch ultramarine; which is only fmalt well ground and pulverized. See the article SMALT.

ULTRAMONTANE, fomething beyond the mountains.

The term is principally ufed in relation to Italy and France, which are feparated by the mountains of the Alps.

ULTRAMUNDANE, *ultramundanus*, beyond the world; is that part of the univerfe fuppofed to be without, or beyond, the limits of our world, or fyftem.

ULTZEN, a town of Lower Saxony, in Germany, twenty-five miles fouth of Lunenburg.

ULVA, in botany, a genus of moffes, confifting of a merely foliaceous fubftance, formed into long cylindrical tubes. This genus includes the tubular tremellæ, and with them all the fmooth confervæ of authors. See the article MOSS.

ULVERSTON, a market-town of Lancafhire, eleven miles north-weft of Lancafter.

ULULA, in ornithology, the grey owl, a fpecies of ftrix, with a circle of long feathers, compofed of two rows, round its face. See the article OWL and STRIX.

ULMA, a town of fwedifh Lapland, fituated at the mouth of a river of the fame name, on the Bothnic gulph, two hundred and eighty miles north of Stockholm.

UMBELLÆ, *umbells*, among botanifts, the round tufts or heads of certain plants fet thick together and all of the fame heighth.

UMBELLIFEROUS PLANTS, are fuch as have their tops branched and fpread out like an umbrella; on each little fubdivifion of which there is growing a fmall flower; fuch are fennel, dill, *&c.*

This flower is always pentapetalous, and is fucceeded by two naked feeds adjoining to each other, which are, according to Ray, the true characteriftics that diftinguifh thofe plants from others.

UMBER, or UMBRE, *umbria*, among painters, *&c.* a kind of dry dufky-coloured earth, which, diluted with water, ferves to make a dark-brown colour, ufually called with us a hair-colour. It is called umber, from *umbra*, a fhadow, as ferving chiefly for the fhading of objects; or, rather, from umbria, a country of Italy, whence it is ufed to be brought.

UMBER, or GRAYLING, in ichthyology. See the article GRAYLING.

UMBILICAL, among anatomifts, fomething relating to the umbilicus, or navel. See

See the articles NAVEL and ABDOMEN.

The umbilical vessels are an assemblage of two arteries, a vein, and the urachus; which altogether constitute what we call the funiculus umbilicalis, or navel-string. See the article NAVEL.

The umbilical arteries arise from the iliacs, near their division into external and internal; and pass thence, on each side of the bladder, through the navel, to the placenta.

The umbilical vein, from innumerable capillaries united into one trunk, descends from the placenta to the liver of the fœtus; where it is partly distributed into the porta, and partly into the cava.

The urachus is only plainly found in brutes; though there is no doubt but it has place, likewise, in mankind. See the article URACHUS, &c.

The use of these vessels is to maintain a continuity and communication between the mother and the fœtus. Some authors will have it, that the fœtus receives its food and increase this way, and that it grows like a vegetable from the mother as the root, of which the umbilical vessels are the stem; and the child the head or fruit of this plant animal. See FOETUS.

UMBILICAL POINTS, in mathematics, the same with foci.

UMBILICUS, the NAVEL, in anatomy. See the article NAVEL.

UMBONE, a name used by some for the style or pistil of a flower. See the articles FLOWER and PISTIL.

UMBRA, or SHADOW. See SHADOW.

UMBRA, in ichthyology, the sciæna, with the upper jaw longest, and the under one bearded. See the article SCIÆNA.

This is a large fish, being frequently five feet in length, and its weight 60 pounds: the ground colour is a dusky olive, with a bluish tinge, and variegated all over with a tinge of other colours: the teeth are small and slender, and there are a great many of them in the fauces, besides those in the jaws.

UMBRE, or UMBER, among painters. See the article UMBER.

UMBRINO, in ichthyology, the blackish variegated sciæna, with the belly-fins black. See the article SCIÆNA.

UMBRIATICA, a town of the hither Calabria, in the kingdom of Naples: east long. 17° 35′, north lat. 39° 15′.

UMPIRE, a third person chosen to decide a controversy left to arbitration. See the article ARBITRATION.

UNCASING, among sportsmen, signifies the cutting up, or fleaing of a fox. See the article HUNTING.

UNCIA, in general, a latin term denoting the twelfth part of any thing; particularly the twelfth part of a pound, called in english an ounce; or the twelfth part of a foot, called an inch. See the articles MEASURE and WEIGHT.

UNCIÆ, in algebra, the numbers prefixed before the letters of the members of any power produced from a binomial, residual, or multinomial root. Thus, in the fourth power of $a+b$, viz. $a^4+4a^3b+6a^2b^2+4ab^3+b^4$, the unciæ are 4, 6, 4; being the same with what others call co-efficients. See BINOMIAL, INVOLUTION, and CO-EFFICIENT.

UNCIAL, *uncialis*, an epithet which antiquaries give to certain large sized letters or characters, antiently used in inscriptions and epitaphs. The word is formed from the latin *uncia*, the twelfth part of any thing, and which in geometrical measure signified the twelfth part of a foot, *viz.* an inch, which was supposed to be the thickness of the stem of one of those letters.

UNCORE, or UNQUES *prist, still ready*, in law, a plea for the defendant, being sued for a debt due on a bond, &c. at a day past, to save the forfeiture of his bond, &c. by affirming that he tendered the debt at the time and place, and that there was none to receive it, and that he is yet also ready to pay the same. See the article TENDER.

UNCTION, *unctio*, the act of anointing or rubbing with oil, or other fatty matter. The cure of divers wounds, ulcers, &c. greatly depend upon repeated unctions with oil, unguents, cerats, &c. For the mercurial unction applied to bring on a salivation, see the article SALIVATION.

UNCTION, in matters of religion, is used for the character conferred on sacred things, by anointing them with oil. Unctions were very frequent among the Hebrews. They anointed both their kings and high-priests at the ceremony of their inauguration. They also anointed the sacred vessels of the tabernacle and temple, to sanctify and consecrate them to the service of God. The unction of kings is supposed to be a ceremony introduced very late among the christian princes. It is said, that none of the emperors were ever anointed before Justinian, or Justin. The emperors of Germany took the practice from those of the eastern empire: king Pepin of France was

was the firſt who received the unction. In the antient chriſtian church, unction always accompanied the ceremonies of baptiſm and confirmation. Extreme unction, or the anointing perſons in the article of death, was alſo practiſed by the antient chriſtians, in compliance with the precept of St. James, chap. v. 14. and 15 verſes; and this extreme unction the romiſh church has advanced to the dignity of a ſacrament. It is adminiſtered to none but ſuch as are afflicted with ſome mortal diſeaſe, or are in a decrepit age. It is refuſed to impenitent perſons, as alſo to criminals. The parts to be anointed are the eyes, the ears, the noſtrils, the mouth, the hands, the feet, and the reins. The laity are anointed in the palms of the hands, but prieſts on the back of it; becauſe the palms of their hands have been already conſecrated by ordination. The parts above-mentioned, are anointed in the form of a croſs. The prieſt begins anointing the ſick perſon's eyes, ſaying, "May God by his holy anointing, pardon you the ſins you have committed by the eyes." In like manner he proceeds to the other parts, varying the words according to the parts he anoints.

UNCUTH, *unknown*, is uſed, in the antient Saxon laws, for him that comes to an inn gueſt-wife, and lies there but one night, in which caſe his hoſt is not bound to anſwer for any offence he committed, whereof he was guiltleſs himſelf. See the article HOGENHINE.

UNDECAGON, is a regular polygon, of eleven ſides. See the article POLYGON.

UNDECEMVIR, a magiſtrate among the antient Athenians, who had ten other collegues or aſſociates joined with him in the ſame commiſſion. The function of the undecemviri at Athens, were much the ſame as thoſe of the prevots de marechauſſe in France: they took care of the apprehending of criminals, ſecured them in the hands of juſtice, and when they were condemned, took them again into cuſtody, that the ſentence might be executed on them. They were choſen by the tribes, each tribe naming its own; and as the number of tribes after Calliſthenes was but ten, which made ten members, a ſcribe or notary was added, which made the number eleven, whence their name οἱ ἕνδεκα, or undecemviri, as Cornelius Nepos calls them in the life of Phocion.

UNDE', UNDEE, or UNDY, See WAVY.

UNDER *the ſea*, in the ſea-language. A ſhip is ſaid to be ſo when ſhe lies ſtill, or waits for ſome other ſhips, with her helm laſhed, or tied up a-lee.

UNDER CURRENTS, currents diſtinct from the upper or apparent currents of the ſeas. Some naturaliſts conclude that there are in divers places under currents which ſet or drive a contrary way from the upper current, whence they ſolve the remarkable phænomena of the ſea's ſetting ſtrongly through the Streights into the Mediterranean, with a conſtant current twenty leagues broad; as alſo, that running from the Euxine through the Boſphorus into the Helleſpont, and thence into the Archipelago: they conjecture, that there is an under current whereby as great a quantity of water is carried out as comes in. To confirm this, it is obſerved, that between the north and ſouth foreland, it is either high or low water upon the ſhore three hours before it is ſo off at ſea; a certain ſign, that though the tide of flood runs aloft, yet the tide of ebb runs under foot, or cloſe by the ground. Yet Dr. Halley ſolves the currents ſetting in at the Streights without overflowing the banks, from the great evaporation, without ſuppoſing any under current. See the article SEA.

UNDER *chamberlain of the exchequer*, an officer that clears the tallies written by the clerk of the tallies, and reads the ſame, in order that the clerk of the pell and the comptrollers thereof may ſee their entries to be true: he likewiſe makes all ſearches for records in the treaſury, and has the cuſtody of domeſday book. See the article EXCHEQUER.

UNDER-SHERIFF, &c. See SHERIFF, &c.

UNDER *treaſurer of England*, was an officer ſaid to be firſt created by king Henry VII. whoſe duty was to cheſt up the king's treaſure as the end of every term, to note the content of the money in each cheſt, and ſee it carried to the king's treaſury for the eaſe of the lord treaſurer.

UNDERMINING. See SAPPING.

UNDERSTANDING, *intellectus*, is defined by the peripatetics to be a faculty of the reaſonable ſoul, converſant about intelligible things, conſidered as intelligible. They alſo make it twofold, *viz.* active and paſſive. Active underſtanding, they hold that faculty of the ſoul by which the ſpecies and images of intelligible things are framed, on occaſion of the preſence of phantaſms or appearances thereof. For maintaining the intellect

to be material, they hold it impoffible it fhould be difpofed to think by any dif-proportionable phantafms of mere body, and therefore that it is obliged to frame other proportionate fpecies of itfelf, and hence its denomination active. Paffive underftanding, is that which receiving the fpecies framed by the active underftanding, breaks forth into actual knowledge. See the article KNOWLEDGE.

The moderns fet afide the peripatetic notion of an active underftanding. The cartefians define the underftanding to be that faculty whereby the mind converfing with, and, as it were, intent on itfelf, evidently knows what is true in any thing not exceeding its capacity. The corpufcular philofophers define the underftanding to be a faculty expreffive of things which ftrike on the external fenfes, either by their images or their effects, and fo enter the mind. Their doctrine is, *nihil effe in intellectu quod non prius fuerit in fenfu*; and to this doctrine Mr. Locke, and moft of the lateft englifh philofophers, fubfcribe. See the article IDEA.

Between the cartefians and corpufcularians there is this farther difference, that the latter make the judgment to belong to the underftanding, but the former to the will. Hence, according to the moft approved opinion of the corpufcularians, the underftanding has two offices, *viz.* perception and judgment; according to the cartefians, it has only one, *viz.* perception. See the articles PERCEPTION, JUDGMENT, and WILL.

UNDERSTANDING is alfo ufed for the act, exercife, or exertion, of this faculty, or the action whereby the mind knows things, or reprefents them in idea to itfelf.

UNDERTAKERS, were antiently fuch perfons as were employed by the king's purveyors, and acted as their deputies. At prefent the name is chiefly ufed for upholders, or perfons who furnifh out funerals, and alfo for fuch who undertake any great work.

UNDERWALD, a canton of Switzerland, bounded by Switz and Lucern on the north, by Uri on the eaft, and by another part of Lucern on the weft; being about 25 miles long, and as many broad.

UNDERWOOD, *fub bofcus*, is coppice, or any wood that is not accounted timber. See the articles COPPICE and TIMBER.

In the cutting the underwood of coppices, when the ftubbles are great, they fhould be ftubbed up; for they only take up a great deal of room, and fend up few fhoots, their cracks and holes letting in water, and ufually half killing them. The taking up thefe fhould be performed in winter, and the fpaces they leave will be occupied by young trees: if not, a long branch of fome neighbouring tree may be laid down, which will foon fend up a fufficient fupply of fuckers for the place. In felling the underwood, it is always proper to leave young trees enough, the worft of which may be taken down the next fall, efpecially if any of them grow near a great tree that will be fit to fell the next feafon, becaufe they may be fpoiled by its fall.

UNDULATION, in phyfics, a kind of tremulous motion or vibration obfervable in a liquid, whereby it alternately rifes and falls like the waves of the fea. See the article WAVE.

Thus undulatory motion, if the liquid be fmooth and at reft, is propagated in concentric circles, as moft people have obferved upon throwing a ftone, or other matter, upon the furface of a ftagnant water, or even upon touching the furface of the water lightly with the finger, or the like. The reafon of thefe circular undulations is, that by touching the furface with your finger, there is produced a depreffion of the water in the place of contact. By this depreffion, the fubjacent parts are moved fucceffively out of their place, and the other adjacent parts thruft upwards, which lying fucceffively on the defcending liquid, follow it; and thus the parts of the liquid are alternately raifed and depreffed, and that circularly. When a ftone is thrown into the liquid, the reciprocal vibrations are more confpicuous: here the water, in the place of immerfion, rifing higher by means of the impulfe, or rebound, till it comes to fall again, gives an impulfe to the adjoining liquid, by which means that is likewife raifed about the place of the ftone as about a center, and forms the firft undulous circle; this falling again, gives another impulfe to the fluid next to it, farther from the center, which rifes likewife in a circle; and thus fucceffively greater and greater circles are produced. See the article IMPULSE.

Undulatory motion is likewife applied to a motion in the air, whereby its parts are agitated after the like manner as waves in the fea; as is fuppofed to be the cafe when the ftring of a mufical inftrument

is ftruck. This undulatory motion of the air is fuppofed the matter or caufe of found. See the article SOUND.

UNGELD, in our antient cuftoms, a perfon out of the protection of the law: fo that if he were murdered, no geld or fine was to be paid, in the way of compenfation, by him that killed him.

UNGHWAR, a city of upper Hungary, fituated near the foot of the Carpathian mountains: eaftlong. 21° 30′, north lat. 48° 40′.

UNGUENT, or OINTMENT, *unguentum*, in medicine and furgery, a topical remedy or compofition, chiefly ufed in the dreffing of wounds and ulcers. See the articles WOUND and ULCER.

Unguents are divided into fimple and compound, though it fo happens that fome of the former are confiderably compounded; and amongft the latter there are fome fimple unguents, and others very little compounded. Unguents, linaments, and cerates, are external forms applied on divers parts of the body, both to cure, to eafe, and to relieve them. Thefe only differ from each other in their confiftence; with regard to which, unguents hold the medium, being ftiffer than liniments, but fofter than cerates. Oils are the bafes of all the three, to which are added wax axungia, and feveral parts of plants, animals, and minerals, both on account of the virtues they furnifh, and to give a confiftence to the oils, and to keep them longer on the part, that they may have more time to act. See CERATE and LINIMENT.

Any of the officinal plafters, diluted with fo much oil as will reduce it to the thicknefs of ftiff honey, forms an ointment; by further increafing the oil it becomes a liniment. See PLASTER.

There are fome confiderable compofitions of this form in the intention of emollients: and amongft the compound unguents there are fome which take in a number of very warm aromatic ingredients, and feem defigned for paralytic infirmities, and cafes that require brifk attenuating applications. At the head of the emollient unguents, is the unguentum dialthææ; and among the attenuating ones, the moft in efteem is the unguentum martiatum and nervinum. There are ointments alfo within the intention of ftrengtheners; and the next intention of any confequence for which we are provided by this form, and which feems as fuitable to it as any, is againft cutaneous foulneffes, as the itch, and fuch like diftempers; and this feems to be the reafon that there is fuch a choice of them now given. But though moft of thefe have the reputation of great antiquity, and hold their places in abundance of officinal difpenfatories down to the prefent, yet they are fo uncleanly in ufe, that they are almoft altogether fallen into neglect, unlefs in fome of our hofpitals; thofe which contain mercury being much more neat and efficacious for the fame purpofe. Some other things of this divifion are little elfe than oils wrought into ointments, by the exchange of oil for lard. Pomatums are alfo ranked among the number of unguents. See the article POMATUM, &c.

UNGUIS, a latin term, fignifying a nail of the hand or foot. See NAIL.

UNGUIS, PANNUS, or PTERYGIUM, in medicine and furgery, a preternatural membrane formed upon the coats of the eye, fo as to extend itfelf over the cornea and pupil, and obftruct the fight.

An unguis of the eye happens when the blood-veffels of the tendinous tunic in the corners of the eyes are turgid with blood, through an obftruction or inflammation. When this diftemper encreafes, there is a fort of carnous web which covers the eye in whole or in part, infomuch that the eyes are offended with the light, and look red fometimes: the web is thin and white, fometimes thicker and more flefhy, rough, obfcure and painful; nay, fometimes it becomes cancerous, which is incurable, and ought not to be touched. In the cure, this preternatural coat is to be removed or taken off by abftergent and gently corroding medicines, or by the hand of a furgeon. The medicines in ufe are fugar-candy, honey, white-wine, bone of the cuttle-fifh, burnt hartfhorn, and calcined egg-fhells; as alfo water of eye-bright, the great celandine, and the fennel, in which crocus metallorum may be infufed: particularly the gall of pike diffolved in a proper water; that is, two ounces to one of the gall. Some recommend a water diftilled from the dung of young geefe in April. If the diforder be obftinate, the juice of the greater celandine may be ufed diluted in fennel-water. The following collyrium is proper: Take of prepared lapis hæmatitis, half a fcruple; of white-vitriol, twenty-five grains; of myrrh and faffron, each five grains; of white-fugar candied, one fcruple. Reduce this

mixture to a powder, and then mix it with equal parts of the waters of roſes, eye-bright, and fennel, and apply it to the eye with a feather, taking care not to injure the pupil. If theſe methods are inſufficient for deſtroying the pellicle, it muſt then be extirpated; in order to which, the patient being in a proper poſture, the ſurgeon takes the ſmall hook (plate CCXCVI. fig. 2. n° 1.) and endeavours to paſs its point under the thickeſt and looſeſt part of the pellicle; and endeavours, by this means, to elevate it a little. In the next place he takes the needle *a* (*ibid.* n° 2.) armed with a thread, and paſſing it under the pellicle, ties it with a double knot; and then faſtening the two ends in a loop, (*ibid.* n° 3.) he thereby attempts to make a gentle elevation. This done, he endeavours to ſeparate the upper and lower margin of the membrane with a lancet, that he may afterwards cut off the reſt immediately in a ſtraight line near the lachrymal caruncle, by a pair of ſmall and ſtraight ſciſſars: he then draws back the thread and membrane towards the cornea; and if it adheres any where to the eye, frees it by degrees with a ſcalpel or ſciſſars; in doing which he muſt take care not to injure the cornea, and obſerve that no part of the membrane be left adhering to the eye, though it is better to have ſome part of the unguis adhering to the cornea, when the ſeparation is difficult, than to wound the cornea and leave ſcars in it; becauſe any ſmall portion of the membrane left behind may be taken off afterwards by heating the eye with gentle eſcharotics.

UNGUIS, in anatomy, is applied to two bones of the noſe, being as thin as ſcales, and reſembling the nail; whence their name. The unguis are the ſmalleſt bones in the upper jaw, and are ſituated near the great canthus of the eyes. Some authors call them oſſa lacrymalia; others, orbitaria-oſſa. They are contiguous to four other bones, *viz.* the coronal; that of the noſe; the maxillary; and that part of the ethmoides which forms the orbit.

UNGUIS, among botaniſts, the narrow part where the petals are inſerted when ſeveral go to make up the flower, as the broader part towards the end is called bractea.

UNGUIS ODORATUS, the NAIL-LIKE SWEET SHELL, in pharmacy, a medicine famous among the antients; but has, for a long time, been out of credit: and the conſequence of the neglect that has been ſhewn it is the loſing its real hiſtory, and the miſtaking different ſubſtances of the ſame origin and nature, though the produce of different animals, for it. We call what we ſuppoſe to be the unguis odoratus of the antients, blatta byzantia; the truth is, however, that our blatta byzantia, or ſweet-hoof, is not the ſame with the unguis odoratus of the antients, though nearly allied to it. The true unguis odoratus of the antients, is a thin, flat, teſtaceous ſubſtance, of an oblong or oval figure, rounded at both ends, and marked on the ſurface with three or four concentric circles, or oval lines: its colour is a duſky-brown with ſome admixture of the orange, ſometimes of a purpliſh tinge: its uſual ſize is that of a full grown nail of a man's thumb, and its thickneſs about the ſame with that of the nail: it is tough, flexile, and elaſtic; and has no peculiar ſmell or taſte. Beſides this genuine unguis odoratus, they had another ſmaller kind: both are the opercula of ſhells of the murex kind, frequent in the Red-ſea. The blatta byzantia is alſo the operculum or cover of a murex, as well as the unguis odoratus; but it belongs to a different ſpecies of that genus: there are alſo two kinds of the blatta byzantia, which are naturally without ſmell and taſte.

UNGULA, in geometry, the ſection of a cylinder cut off by a plane paſſing obliquely through the plane of the baſe and part of the cylindric ſurface.

UNGULA, in natural hiſtory, the claw or hoof of a quadruped. See HOOF.

UNICORN, μονοκερως, an animal, famous among the antients, but looked on by the moderns as fabulous, denominated from its diſtinguiſhing characteriſtic of having one horn only, which is repreſented as five palms long, and growing in the middle of the forehead. It is alſo ſaid to be about the ſize of an horſe: its hair ſhort, and of a darkiſh brown colour, very timorous, and therefore keeping moſtly in the woods. Some will have it an amphibious animal, and its horn moveable at pleaſure. Others make all its ſtrength to conſiſt in its horn; and add, that when purſued by the hunters, it precipitates itſelf from the top of the higheſt rocks, and pitches upon its horn, which ſuſtains the whole effort of its fall, ſo that it receives no damage thereby. It is added, that it is wonderfully fond of

chaste persons; and therefore, in order to take it, a virgin is placed in its way, whom, when the unicorn spies, he lies down by her, lays his head in her lap, and falls asleep; upon which, the virgin making a signal, the hunters come in and take the beast; which could never be caught by any other means, because it would either cast itself from a rock or die.

The unicorn is one of the supporters of the british arms. It is represented by heralds passant, and sometimes rampant. When in this last action, as in the british arms, it is properly said to be saillant. Argent, an unicorn sejant sable, armed and unguled, or, borne by the name of harding.

UNICORN-FISH, in ichthyology, a species of the monodon, or narwal, an extremely singular fish; the length of a full-grown one being about five and twenty feet, but commonly from sixteen to twenty: it has only one tooth, remarkably long, which is fixed in the upper-jaw, and runs parallel with the length of the fish, so that it has more the appearance of a horn than a tooth. See the article NARWAL.

The diameter of this fish equals, at least, half its length, whence it is very unwieldy: the head is small, and shaped like that of a roach: there is no fin on the back; and the fistule is in the vertex or uppermost part of the head. The tooth grows to ten, or more, feet in length, is about the thickness of a man's wrist towards the base, and thence becomes gradually smaller all the way to the point. See plate CCXCVI. fig. 5.

UNICORNU, FOSSILE, *Fossil unicorn's horn*, the name of a substance much used in medicine in some parts of the world, and, which seems to have been very little understood by many who have written of it; but is now determined to be no other than a terrene, crustaceous spar, not very different from the osteocolla and other bodies of that genus called the cibdeloplacium. See the article OSTEOCOLLA and CIBDELOPLACIA.

It is esteemed as a sudorific and astringent, and is given in fevers attended with diarrhoeas, with great success.

UNIFORM denotes a thing to be similar, or consistent, either with another thing or with itself, in respect of figure, structure, proportion, and the like; in which sense it stands opposed to difform. See the article DIFFORM.

Thus the uniform flowers of plants are such as are of the same figure all around, having their fore and back parts, as also their right and left parts, exactly alike. For uniform motion, &c. see the article MOTION and EQUABLE.

UNIFORMITY, a similitude, or resemblance, between the parts of a whole: such is that we meet with in figures of many sides, and angles respectively equal, and answerable to each other.

This term is particularly applied to one and the same form of public prayers and administration of sacraments, and other rites, &c. of the church of England, prescribed by the famous stat. 1 Eliz. and 14 Car. II. called the act of uniformity.

UNIOLA, in botany, a genus of the triandria-digynia class of plants, the corolla whereof consists of a bivalve glume: the valves are of a lanceolato-compressed figure like those of the cup: the inner valve appears somewhat higher than the outer one: the corolla performs the office of a pericarpium, inclosing the seed, which is single, and of an ovated oblong figure.

UNION, a junction, coalition, or assemblage of two or more different things in one.

UNION, among painters, expresses a symmetry and agreement between the several parts of a painting, when *e. gr.* there is a great deal of relation and connection between them, both as to the figuring and colouring; so that they apparently conspire to form one thing.

UNION, in architecture, may denote a harmony between the colours in the materials of a building.

UNION, in an ecclesiastical sense, denotes a combining or consolidating of two churches into one. There are two kinds of this union, as when one church is made subject to another, and one parson is made rector of both; and where a conventual church is made a cathedral. In case two churches were so small as that the tithes did not make a competent provision for each of the parsons, they might be united at common law before any act of parliament was made for that purpose. By statute there may be an union of two churches where there lie not above a mile distant from each other, and where the value of the one exceeds not six pounds a year in the king's books of first fruits; which is done by the consent of the bishop, the patron, and incumbent. Also,

in cities or corporate towns, it is ordained, that the bishop, the patron, and the mayors, or chief magistrates of the place, &c. may unite parish-churches therein: yet, when the income of the church is above one hundred pounds *per annum*, there the major part of the parishioners are to agree to the same; and after the union, the patrons of those churches shall present by turns, &c. but notwithstanding each of the parishes continue distinct as to rates, charges, &c.

UNION, or the UNION, by way of eminence, is more particularly used to express the act whereby the two separate kingdoms of England and Scotland were incorporated into one, under the title of the kingdom of Great-Britain. This happy union, in vain attempted by king James I. was at length effected in the year 1707, by the general consent of the queen and the estates of each realm. The chief articles of this union are, That the two kingdoms shall be united into one kingdom, by the name of Great-Britain: that they, in consequence thereof, be represented by one parliament, of which sixteen peers and forty-five commoners are to be elected for Scotland, and have the same privileges with those of England: that the subjects of either nation shall have equal freedom of trade, and be liable to the same customs, and the like laws for public government, &c. The kirk, or church of Scotland, is confirmed; and the courts of justice are to remain the same as they were before the union, yet subject to regulation, &c. A court of exchequer is also erected in Scotland, to be a court of record, revenue, and judicature, for ever; and barons of the said court are appointed, who shall be the judges there, &c. See the articles PEER, PARLIAMENT, &c.

UNISON, in music, the effect of two sounds which are equal in degree of tune, or in point of gravity and acuteness. See the article TUNE.

Unison may be defined a consonance of two sounds produced by two strings, or other bodies, of the same matter, length, thickness, tension, &c. equally struck, and at the same time: so that they yield the same tone or sound. See SOUND.

Unison is the first and greatest of concords, and the foundation of all the rest, according to Aristoxenus and most of the antients: yet some deny it to be any concord at all, maintaining it to be only that in sounds which unity is in numbers.

Others restrain the word concord to intervals, and make it include a difference of tune; but this is precarious: for as the word concord signifies an agreement of sounds, it is certainly applicable to unisons of the first degree.

But though unisonance, or an equality of tune, makes the most perfect agreement of sound, it is not true, that the nearer any two sounds come to an equality of tune, they are the more agreeable. The mind is delighted with variety; and the reason of the agreeableness or disagreeableness of two sounds must be ascribed to some other cause than the quality or inequality of the number of their vibrations. It is a famed phænomenon in music, that an intense sound being raised, either with the voice or sonorous body, another sonorous body near it, whose tune is either unison or octave to that sound, will sound its proper note, unison or octave, to the given note. The experiment is easily tried by the strings of two instruments, or by a voice and harpsichord; or a bell, or even a drinking-glass.

This our philosophers account for thus; one string being struck, and the air put in motion thereby, every other string, within the reach of that motion, will receive some impression therefrom: but each string can only move with a determinate velocity of recourses or vibrations; and all unisons proceed from equal or equidiurnal vibrations; and other concords, from other proportions. The unison string then, keeping equal pace with the sounding string, as having the same measure of vibrations, must have its motion continued, and still improved, till its motion become sensible, and it gives a distinct sound. Other concording strings have their motion propagated in different degrees, according to the frequency of the coincidence of their vibrations, with those of the sounded string; the octave, therefore, most sensibly: then in the fifth; after which the crossing of the motions prevents any effect.

This they illustrate by the pendulum, which, being set a moving, the motion may be continued, and still improved, and augmented, by making frequent, light, coincident impulses; as blowing on it when the vibration is just finished: but if it be touched by any cross or opposite motion, and this too frequently, the motion will be interrupted and cease altogether,

altogether. So of two unifon-ftrings, if the one be forcibly ftruck, it communicates motion by the air to the other: and being equidiurnal in their vibrations, that is, finifhing them precifely together, the motion of the other will be improved and heightened by the frequent impulfes received from the vibrations of the firft; becaufe given precifely, when that other has finifhed its vibration and is ready to return: but if the vibration of the chords be unequal in duration, there will be a croffing of motions lefs or more, according to the proportion of the inequality; by which the motion of the untouched ftring will be fo checked as never to be fenfible. And this, we find, is the cafe in all confonances, except unifon, octave, and the fifth.

UNIT, UNITE, or UNITY, in arithmetic, the number one, or one fingle individual part of difcrete quantity. See the article NUMBER.

UNITED NETHERLANDS confift of the provinces of Holland, Zealand, Friefland, Groningen, Overyffel, Gelderland, with Zutphen and Utrecht; thefe are bounded by the German-fea on the north and weft; by the circle of Weftphalia on the eaft, and by Flanders, Brabant, and the dutchy of Cleves on the fouth; lying between 3° 20′ and 7° 30′ eaft longitude, and between 51° 35′ and 52° 40′ north latitude; being about fifty miles long, and as many broad, including the Zuyder-fea, which takes up a confiderable fpace between thefe limits. See the articles NETHERLANDS, PROVINCES, ZEALAND, &c.

UNITY, in poetry. In the drama there are three unities to be obferved, *viz.* the unity of action, that of time, and that of place. In the epic poem, the great, and almoft only, unity, is that of the action. Some regard, indeed, ought to be had to that of time; that of place there is no room for. The unity of character is not reckoned among the unities. See the article EPIC, &c.

The unity of the dramatic action confifts of the unity of the intrigue in comedy, and that of the danger in tragedy; and this not only in the plan of the fable, but alfo in the fable extended and filled with epifodes. See COMEDY, &c.

The epifodes are to be worked in without corrupting the unity, or forming a double action; and the feveral members are to be fo connected together, as to be confiftent with that continuity of action fo neceffary to the body, and which Horace prefcribes, when he fays,

Sit quodvis fimplex duntaxat & unum.

See the article EPISODE.

The unity of the epic action, Mr. Dacier obferves, does not confift in the unity of the hero, or in the unity of his character and manners, though thefe be circumftances neceffary thereto. The unity of action requires that there be but one principal action, of which all the reft are to be incidents or dependencies. See ACTION.

F. Boffu affigns three things requifite thereto; the firft, that no epifode be ufed but what is fetched from the plan and ground of the action, and which is a natural member of that body; the fecond, that the epifodes and members be well connected with each other; the third, is not to finifh any epifode, fo as it may appear a whole action, but to let each be always feen in its quality of member of the body, and an unfinifhed part.

UNITY *of poffeffion*, in law, fignifies a joint poffeffion of two rights by feveral titles.

UNIVALVE *Shells*, in natural hiftory, a term ufed to exprefs one of the three general claffes of fhell-fifh; the other two being the bivalves and multivalves. See SHELL, BIVALVES, and MULTIVALVES.

The univalve fhells are thofe which confift only of one piece, not of two or more joined together. Of thefe univalve fhells, nature affords a very great variety; fo that they are aptly diftributed by a late French author into fifteen diftinct genera. Thefe are, 1. The patellæ, or limpets. 2. The patellæ planæ, called alfo auris marina, the ear-fhell. 3. The canales, or tubuli marini, the fea-tubes. 4. The lunar cochleæ, or round-mouthed fnails. 5. The cochleæ femilunares, or fnails with femicircular mouths. 6. The cochleæ ore depreffo, or flat-mouthed fnails. 7. The naviculæ or boat-fhells, commonly called nautili or nautilus. 8. The buccina, or trumpet-fhells. 9. The turbines. 10. The volutæ. 11. The rhombi. 12. The murices. 13. The purpuræ. 14. The conchæ globofæ. And 15. The porcellanæ, each of which fee under its proper head, PATELLA, AURIS *Marina*, &c. Hift. Nat. Ecclairc. part II. p. 235.

UNIVERSAL, fomething that is common to many things; or it is one thing belonging to many, or all things.

In logic, univerfal is either complex or incomplex. A complex univerfal is either an univerfal propofition, as every whole

whole is greater than its part; or whatever raiſes a manifold conception in the mind, as the definition of a reaſonable animal. An incomplex univerſal, is what produces only one conception in the mind, and is a ſimple thing reſpecting many; as human nature, which relates to every individual wherein it is found.

UNIVERSALITY, that quality which denominates a thing univerſal. See the preceding article.

UNIVERSE, a collective name, ſignifying the whole world, or the aſſemblage of heaven and earth, with all things therein. See HEAVEN and EARTH.

As ſpace is, in its own nature, every way infinite, it gives us an idea of the infinity of the univerſe, which can therefore be only in part comprehended by us: and that part of the univerſe which we can have any notion of, is that which is the ſubject of our ſenſes; and of this the eye preſents us with an idea of a vaſt extended proſpect, and the appearance of various ſorts of bodies diſſeminated thro' the ſame.

The infinite abyſs of ſpace, which the Greeks call το παν, the Latins *inane*, and we the univerſe, does undoubtedly comprehend an infinity of ſyſtems of moving bodies round one very large central one, which the Romans called *ſol*, and we the ſun. This collection of bodies is therefore properly called the ſolar ſyſtem, and ſometimes the mundane ſyſtem, from the latin word *mundus*, the world. See the article SYSTEM.

That the univerſe contains as many ſolar ſyſtems or worlds, as there are what we called fixed ſtars, ſeems reaſonable to infer from hence, that our ſun, removed to the diſtance of a ſtar, would appear juſt as a ſtar does, and all the bodies moving about it would diſappear entirely. Now the reaſon why they diſappear, is becauſe they are opake bodies, and too ſmall to be ſeen at ſo great a diſtance, without an intenſe degree of light; whereas theirs is the weakeſt that can be, as being firſt borrowed, and then reflected to the eye. See the article STAR.

But the ſun, by reaſon of his immenſe bulk and innate light, which is the ſtrongeſt poſſible, will be viſible at an immenſe diſtance; but the greater the diſtance, the leſs bright it will appear, and of a leſſer magnitude: and therefore every ſtar of every magnitude, may probably be a ſun like our own, informing a ſyſtem of planets, or moving bodies, each of which may be inhabited like our earth, with various kinds of animals, and ſtored with vegetable and other ſubſtances.

We can perceive, ſays Mr. Mac Laurin, no bounds of the vaſt expanſe in which natural cauſes operate; nor can we fix any border or termination of the univerſe; and we are equally at a loſs to trace things to their elements, and to diſcover the limits, which incloſe the ſubdiviſions of matter. The objects, which we commonly call great, vaniſh when we contemplate the vaſt body of the earth: the terraqueous globe itſelf is ſoon loſt in the ſolar ſyſtem; being in ſome parts ſeen as a planet, or diſtant ſtar; and, in great part of the ſyſtem unknown, or viſible only at rare times to vigilant obſervers, aſſiſted, perhaps with inſtruments like our teleſcopes. The ſun itſelf dwindles into a ſtar: ſaturn's vaſt orbit, and the orbits of all the comets, croud into a point, when viewed from numberleſs places between the earth and the neareſt fixed ſtars. Other ſuns illuminate other ſyſtems, where our ſun's rays are unperceived: but all theſe alſo are ſwallowed up in the vaſt expanſe of the univerſe. Even all the ſyſtems of the ſtars that ſparkle in the cleareſt ſky, muſt poſſeſs a ſmall corner only of that ſpace over which ſuch ſyſtems are diſperſed. And after we have riſen ſo high, and left all definite meaſures ſo far behind us, we find ourſelves no nearer to a term or limit; for all this is nothing to what may be diſplayed in the infinite expanſe, beyond the remoteſt ſtars that ever have been diſcovered.

In this view of the univerſe, an auguſt idea ariſes in the mind, worthy of the infinite and wiſe author of nature, who can never be ſuppoſed to have created ſo many glorious orbs, to anſwer ſo trifling a purpoſe as the twinkling to mortals by night now and then; beſides that the far greateſt part of the ſtars are never ſeen by us at all, as has been ſhewn under STAR.

UNIVERSITY, *univerſitas*, a collective term, applied to an aſſemblage of ſeveral colleges, eſtabliſhed in a city, or out town, wherein are profeſſors in the ſeveral ſciences, appointed to teach them to ſtudents; and where degrees or certificates of ſtudy in the divers faculties are taken up. See ART and SCIENCE.

In each univerſity four faculties are uſually taught, theology, medicine, law, and the arts and ſciences. See the article THEOLOGY, *&c.*

They are called univerſities, or univerſal ſchools,

schools, by reason the four faculties are supposed to take in the whole compass of study. See the article FACULTY.

In the eye of the law, an university is held a mere lay body, or community; though, in reality, it be a mixed body, composed partly of laymen, and partly of ecclesiastics. See COMMUNITY, &c.

Universities had their first rise in the XIIth and XIIIth centuries. Those of Paris and Bologna pretend to be the first that were set on foot; but then they were on a different footing from the universities among us. See SEMINARY and SCHOOL.

Our own universities, of Oxford and Cambridge, seem intitled to the greatest antiquity of any in the world; and Baliol and Merton colleges in Oxford, and St. Peter's in Cambridge, all made colleges in the XIIIth century, may be said to be the first regular endowments of this kind in Europe.

For though University college in Cambridge had been a place for students ever since the year 872, yet this, like many of the other antient colleges beyond sea, and Leyden to this day, was no proper college; but the students, without any distinction of habit, lived in citizens houses, having only meeting places to hear lectures and dispute.

In after-times there were houses built for the students to live in society; only each to be at his own charge, as in the inns of courts: these, at first, were called inns, but now halls. At last, plentiful revenues were settled on several of these halls, to maintain the students in diet, apparel, &c. and these were called colleges. See OXFORD, CAMBRIDGE and COLLEGE.

The universities of Oxford and Cambridge are governed next under the king, by a chancellor, who is to take care of the government of the whole university, to maintain the liberties thereof, &c. Under him is the high steward, whose office is to assist the chancellor, and other officers, when required, in the execution of their offices, and to hear and determine capital causes, according to the laws of the land, and the privileges of the university. The next officer is the vice-chancellor, who officiates for the chancellor in his absence. There are also two proctors, who assist in the government of the university, particularly in the business of school-exercise, taking up degrees, punishing violators of the statutes, &c. Add to these a public orator, keeper of records, register, beadles, and verger.

The universities of Scotland are four, *viz.* those of St. Andrews, Aberdeen, Edinburgh, and Glasgow. See the articles *St.* ANDREW'S, ABERDEEN, &c.

In Ireland there is only one university, *viz.* that of Dublin. See DUBLIN.

UNIVOCAL, in the schools, is applied to two or more names, or terms, that have but one signification, in opposition to equivocal, which is where one term has two or more significations. See EQUIVOCAL.

Our univocal terms are such, whose name as well as nature, is the same, in opposition to equivocals, whose names are the same, but their natures very different.

The antients believed that all perfect animals were produced by univocal generation; that is, by the sole union or copulation of a male and female of the same species or denomination; and that insects were produced by equivocal generation, without any seed, and merely of the corruption of the earth, exhaled, and, as it were, impregnated, by the sun's rays: but this doctrine of insects is now exploded. See GENERATION.

UNLAWFUL, illegal, something prohibited by, or contrary to, the terms of law, either divine or human. See LAW.

UNLAWFUL ASSEMBLY, the meeting of three or more persons together, by force to commit some unlawful act, as to assault any person, to enter his house or land, &c. and thus abiding together, whether they attempt the execution or not. See the article RIOT.

UNLIMITED, or INDETERMINATE PROBLEM, is such a one as is capable of infinite solutions. See PROBLEM.

UNMOOR, a term used at sea: when a vessel which was riding at anchor weighs the same, or gets it up, in order to sail, they say she is unmooring.

UNNA, a town of Westphalia, thirty-five miles south of Munster, subject to the king of Prussia.

UNNA is also a river of Bosnia, forming part of the boundary between Christendom and Turky, and falling into the Save.

UNSEELING, in falconry, is the taking away the thread that runs through a hawk's eye-lids, and hinders its sight.

VOCABULARY, *vocabularium*, in grammar, denotes the collection of the words of a language, with their significations, otherwise called a dictionary, lexicon, or nomenclature. See DICTIONARY, &c.

A vocabu'ary is properly a leſſer kind of dictionary which does not enter ſo minutely into the origins and different acceptations of words. See WORD.

VOCAL, ſomething that relates to the voice or ſpeech: thus vocal muſic is that ſet to words, eſpecially verſes, and to be performed by the voice, in contradiſtinction to inſtrumental muſic, compoſed only for inſtruments, without ſinging. See the article VOICE, VERSE, *&c.*

VOCATIVE, in grammar, the fifth ſtate or caſe of nouns. See the articles NOUN and CASE.

When we name the perſon we are ſpeaking to, or addreſs ourſelves to the thing we are ſpeaking of, as if it were a perſon, the noun, or name, requires a new relation, which the Latins and Greeks expreſs by a new termination, called the vocative; as from *dominus, a lord,* is formed the vocative *domine, o lord.*

In engliſh, and moſt of the modern languages, the vocative is expreſſed in nouns that have an article in the nominative, by omitting that article; as *the Lord is my hope*; *Lord, thou art my hope:* though, on many occaſions, we uſe an interjection.

VOGHERA, a town of the dutchy of Milan, in Italy, fifteen miles ſouth-weſt of Pavia.

VOICE, *vox,* a ſound produced in the throat and mouth of an animal, by an apparatus of inſtruments for that purpoſe. See the article SOUND.

Voices are either articulate or inarticulate. Articulate voices are thoſe whereof ſeveral conſpire together to form ſome aſſemblage or little ſyſtem of ſounds; ſuch are the voices expreſſing the letters of an alphabet, numbers of which joined together, form words. Inarticulate voices are ſuch as are not organized, or aſſembled into words; ſuch is the barking of dogs, the braying of aſſes, the hiſſing of ſerpents, the ſinging of birds, *&c.*

The formation of the human voice, with all the varieties thereof obſerved in ſpeech, muſic, *&c.* makes a very curious article of inquiry; and the apparatus and organiſm of the parts adminiſtring thereto, is ſomething exceedingly ſurpriſing. Thoſe parts are the trachea or windpipe, through which the air paſſes and repaſſes into the lungs; the larynx, which is a ſhort cylindric canal at the head of the trachea; and the glottis, which is a little oval cleft or chink left between two ſemicircular membranes ſtretched horizontally withinſide the larynx; which membranes, though capable of joining cloſe together, do generally leave an interval, either greater or leſs, between them called the glottis. A particular deſcription of each part may be ſeen under the articles TRACHEA, LARYNX, and GLOTTIS.

The long canal of the trachea, terminated at top with the glottis, appears ſo like a flute, that the antients made no doubt but the trachea contributed the ſame to the voice, as the body of the flute does to the ſound of that inſtrument. Galen himſelf fell in ſome meaſure into the miſtake; he perceived indeed, that the principal organ of the voice was the glottis, but he ſtill allowed the trachea a conſiderable ſhare in the production of the ſound. Galen's opinion was followed by all the antients after him, and even by all the moderns before M. Dodart: but that author obſerves, that we do not either ſpeak or ſing when we inſpire or take in the air, but only when we exſpire or expel it; and that the air coming out of the lungs, paſſes always out of the minuter veſicles of that part into larger, and at laſt into the trachea itſelf, which is the largeſt of all: that thus its paſſage becoming ſtill more free and eaſy, and thus more than ever in the trachea, it can never undergo ſuch a violence, and acquire ſuch a velocity in that canal, as is required to the production of ſound: but that as the aperture of the glottis is very ſmall, in compariſon with the width of the trachea, the air can never get out of the trachea by the glottis, without a vaſt compreſſion and augmentation of its velocity; and that by this means in paſſing, it communicates a briſk agitation to the minute parts of the two lips of the glottis, and gives them a kind of ſpring, and occaſions them to make vibrations, which communicated to the paſſing air, are what really occaſion the ſound. The ſound thus formed, proceeds into the cavity of the mouth and noſtrils, where it is reflected and reſounds; and on this reſonance, M. Dodart ſhews, it is that the agreeableneſs of the voice intirely depends. The different conſiſtences, forms, *&c.* of the divers parts of the mouth, contribute to the reſonance, each in their way; and from this mixture of ſo many different reſonances in their due proportion, there reſults an harmony in the human voice inimitable

inimitable by any mufician. Hence it is that when any of thefe parts are difordered, *e. g.* when the nofe is ftopped, the voice becomes difpleafing. This refonance in the cavity of the mouth, does not feem to confift in a fimple reflection, fuch as that of a vault, *&c.* but in a refonance proportionate to the tones of the found fent into the mouth from the glottis; and accordingly we find this cavity to lengthen and fhorten itfelf, according to the depth or acutenefs of the tone. See the articles SOUND, TONE, *&c.*

As the organs that form the voice make a kind of wind inftrument, one might imagine to find fome provifion therein anfwerable to that which produces the difference of tone in fome other wind-inftruments. The tone, therefore, muft be attributed either to the mouth and noftrils, which occafion the refonance, or to the glottis, which produces the found: and as all the different tones are produced in man by the fame inftrument, it follows, that the part which produces them, muft be capable of changes anfwerable thereto. The different apertures of the lips of the glottis, it is proved, produce all the different tones in the feveral parts of mufic, and the manner is thus. The voice, it is fhewn, can only be formed by the glottis, but the tones of the voice are modifications of the voice, and thefe can only be produced by the modifications of the glottis. Now the glottis is capable only of one modification, which is the mutual approach or recefs of its lips; it is this, therefore, produces the different tones. Now that modification includes two circumftances; the firft and principal is, that the lips are ftretched more and more from the loweft tone to the higheft: the fecond is, that the more they are ftretched, the nearer they approach. From the firft, it follows, that their vibrations will be fo much the quicker, as they come neareft their higheft tone; and that the voice will be juft, when the two lips are equally ftretched; and falfe, when unequally; which agrees perfectly well with the nature of ftring inftruments. From the fecond, it follows, that the higher the tones are, the nearer will they approach to each other, which agrees perfectly well with inftruments governed by reeds or plugs.

The degrees of tenfion of the lips, are the firft and principal caufe of tones, but their differences are infenfible; the degrees of approach are only confequences of that tenfion, but their differences are more eafily affigned. They are different apertures that produce, or at leaft that accompany, different tones, both in natural wind inftruments, and artificial ones; and the diminution of the aperture, raifes the tones both of the glottis, and the reed.

VOICE, in grammar, a circumftance in verbs, whereby they come to be confidered as either active or paffive, *i. e.* either expreffing an action impreffed on another fubject, as, *I beat*, or receiving it from another, as, *I am beaten.* See the articles ACTIVE and PASSIVE.

The Greeks have a third voice called the medial voice, thus denominated, becaufe it has fometimes an active and fometimes a paffive fignification; though generally it is of an active fignification. With regard to the termination of this medial voice, it is to be obferved, that the prefent and imperfect tenfes are the fame with thofe of the paffive voice; or, in other words, when thefe tenfes of the paffive voice are taken actively, they are then denominated of the medial voice.

VOICE, in matters of election, denotes a vote or fuffrage. See the article VOTE. In this fenfe a man is faid to have a deliberative voice, when he has a right to give his advice and opinion in a matter of debate, and his fuffrage is taken. An active voice, when he gives his vote for the election of any one; and a paffive voice, when the fuffrages may fall on himfelf to be elected. An excitative voice, when he may act to procure another to be elected. A confultative voice, when he can only offer reafons and remonftrances, whereon the chief or head determines at his own difcretion.

VOID SPACE, in phyfics. See the article VACUUM, *&c.*

VOID and VOIDABLE, are terms frequently ufed in our law; as a thing that is done contrary to law at the time of the doing, it is faid to be void, and no perfon fhall be bound thereby. But where a thing is only voidable, and not void, though it be what the perfon that did it ought not to have done, yet when it is done, the doer cannot avoid the fame, notwithftanding by fome act in law it may be void in his heir, *&c.* It has been held, that the bond of an infant, or one non compos mentis, is void, becaufe the law has not appointed the doing any thing to avoid fuch bonds. A leafe for term of

of life, which is voidable, must be made void by re-entry, &c. and a deed is generally avoided by special pleading.

VOIDANCE, or VACANCY, in the canon law, a want of an incumbent upon a benefice, &c. See the articles AVOIDANCE and VACANCY.

VOIDED, in heraldry, is understood of an ordinary whose inner or middle part is cut out, leaving nothing but its edges to shew its form, so that the field appears through it. Hence it is needless to express the colour or metal of the voided part, because it must of course be that of the field. The cross voided, differs from the cross fimbriated, in that the latter does not shew the field through it, as the other does; and the same obtains in other ordinaries.

VOIDER, in heraldry, one of the ordinaries whose figure is much like that of a flask of flanch, only that it doth not bend so much. See plate CCXCVII. fig. 5.

VOIDING, or EVACUATING, in medicine. See the article EVACUATION.

VOIR-DIRE, in law, a term used where there is a busy evidence not otherwise to be excepted against, and it is prayed upon a trial at law that the witness may on oath speak the truth, whether he shall get or lose by the matter in controversy; and in case it appears that he is unconcerned and disinterested, his testimony is allowed, otherwise it is not. A witness upon a voir-dire, may be examined by the court if he be not a party interested in the cause, as well as the party for whom he is an evidence, *viz.* the plaintiff or defendant.

VOL, among heralds, signifies the two wings of a fowl joined together, borne in armoury, as being the whole that makes the flight. Accordingly, a demi-vol is a single wing.

VOLA, the palm or inside of the hand, comprehended between the fingers and the wrist.

VOLANO, or VALONA, a port-town of Italy, in the pope's territory, and dutchy of Ferrara, situated on one of the mouths of the Po, on the gulph of Venice, forty miles east of Ferrara.

VOLANT, in heraldry, is when a bird in a coat of arms is drawn flying, or having its wings spread out.

VOLATILE, in physics, is commonly used to denote a mixed body whose integral parts are easily dissipated by fire or heat; but it is more properly used for bodies whose elements or first component parts are easily separated from each other, and dispersed in air. For as any mixed body is said to be fixed in a double sense, so may it be said to be volatile two ways; whence the same body, *e. gr.* mercury, is both volatile and fixed at the same time; since, as its integral parts, or those which still retain the nature of mercury, are easily separable by fire, and readily flies away, it is said to be volatile; and yet as it is very difficult to destroy its contexture, and resolve it by fire, or any other menstruum, into its first elements, it is said to be fixed; the same may be said of sulphur, antimony, &c. See the article FIXED BODIES.

Minerals, for the generality, are less volatile than vegetables, and vegetables are less so than animals. The chemists distinguish greatly between volatile salts and fixed salts. The capitals of aludels stop and collect the volatile parts of substances in sublimation, and make what we call flowers. See the articles FLOWERS, SALTS, &c.

The particles of fluids which do not cohere very strongly together, says Sir Isaac Newton, and are of such a smallness as renders them most susceptible of those agitations which keep liquors in a fluor, are most easily separated and rarified into vapour; and, in the language of the chemists, they are volatile, rarifying with an easy heat, and condensing with cold. But those which are grosser, and by that means less susceptible of agitation, or cohere by a stronger attraction, are not separated without a stronger heat, or perhaps not without fermentation; these are what the chemists call fixed bodies.

When the fire decompounds any mixed body, the parts most disposed to receive a great motion are soonest loosened, and rise up in the order which the differences of that disposition give them, the rest remaining immoveable at the bottom of the vessel. Those that rise first are called volatile parts; such are phlegm, oil, spirits and salts, both urinous and alkalious. The parts remaining, *viz.* earth and lixivial salts, are called fixed. See the articles PHLEGM, OIL, &c.

VOLATILISATION, or VOLATILIZATION, the act of rendering fixed bodies volatile, or of resolving them by fire into a fine subtile vapour or spirit, which easily dissipates and flies away. All bodies, even the most fixed, as gold, may be volatilized;

latized; either of themſelves, or with the admixture of ſome volatile ſubſtance, or ſpirit, by diſtillation or ſublimation. See the articles GOLD, DISTILLATION, &c.

VOLATILITY. See the articles VOLATILE and SUBLIMATION.

VOLCANO, or VULCANO. See the article VULCANO.

VOLERY, a great bird-cage, ſo large that the birds have room to fly up and down in it.

VOLHINIA, or VOLONIA, a province of Poland, bounded by Poleſia, on the north; by the lower Volhinia, or Ukrain, in the territories of Ruſſia, on the eaſt; by Podolia, on the ſouth; and by the province of Red Ruſſia, on the weſt.

VOLITION, the act of willing. See the article WILLING.

VOLKAMERIA, in botany, a genus of the didynamia-angioſpermia claſs of plants, the corolla whereof conſiſts of a ringent, ſingle petal: the tube is cylindric, and twice the length of the cup: the limb is divided into five plane ſegments: the fruit is a roundiſh bilocular capſule; the ſeed is a ſingle bilocular nut.

VOLLEY, a military ſalute, made by diſcharging a great number of fire-arms at the ſame time.

VOLO, in roman antiquity, an appellation given to the ſlaves, who, during the ſecond punic war, offered themſelves to ſerve in the army.

VOLT, or VOLTE, in the manege, a round or circular tread; and hence, by the phraſe, to make volts, is underſtood a gate of two treads, made by a horſe going ſideways round a center, in ſuch a manner, that theſe two treads make parallel tracts, one larger made by the fore feet, and another ſmaller made by the hind feet, the croup approaching towards the center, and the ſhoulders bearing outwards. Sometimes the volt is of one tread; as when a horſe makes volts in corvets, and in caprioles, ſo that the haunches follow the ſhoulders, and move forwards on the ſame tread. In general, the way and tract of a volt is made ſometimes round, ſometimes oval, and ſometimes ſquare, of four ſtraight lines; ſo that theſe treads, whether round or ſquare, incloſe a terrain, or manege ground, the middle of which is ſometimes diſtinguiſhed by a pillar, or elſe by an imaginary center, which is there ſuppoſed in order to regulate the diſtances and the juſtneſs of the volt.

A demi-volt is a demi-round of one or two treads, made by the horſe at one of the corners of the volt, or elſe at the end of the line of the paſſade; ſo that being near the end of this line, or one of the corners of the volt, he changes hands, to return by a ſemi-circle.

A renverſed volt, is a tract of two treads, made by the horſe, with his head to the center, and his croup out; ſo that he goes ſide-ways upon a walk, trot, or gallop, and traces out a ſmall circumference with his ſhoulders, and a larger one with his croup.

This different ſituation of the ſhoulders and the croup, with reſpect to the center, gave this volt the name of renverſed, as being oppoſite in ſituation to the former.

VOLTA, a river of Guinea, in Africa, which running from north to ſouth, falls into the ocean eaſt of Acra.

VOLTERRA, a town of Tuſcany, in Italy, twenty-three miles ſouth of Florence.

VOLTURARA, a town of the kingdom of Naples, fifty-five miles north-eaſt of the city of Naples.

VOLTURNO, a river of the kingdom of Naples, which, riſing in the province of Moliſe, runs by Capua, and falls into the gulph of Gaieta.

VOLUBILIS, in botany, a name uſed by Dillenius for a ſpecies of convolvulus. See the article CONVOLVULUS.

VOLUME, *volumen*, in matters of literature, a book, or writing, of a juſt bulk to be bound by itſelf. The name is derived from the Latin *volvere*, to roll up; the antient manner of making up books being in rolls of bark or parchment. See the articles BOOK, TOME, &c.

Foreign philoſophers uſe the phraſe, volume of a body, for its bulk, or the ſpace incloſed within its ſuperficies. See the articles BODY, SOLID, &c.

VOLUMUS, in law, the firſt word of a clauſe in one ſpecies of the king's writs of protection and letters-patent.

VOLUNT, *voluntas*, in law, is when a tenant holds lands, &c. at the will of the leſſor, or lord of the manor. See the article TENURE.

VOLUNTARY, in muſic, a piece played by a muſician extempore, according to his fancy. This is often uſed before he begins to ſet himſelf to play any particular compoſition, to try the inſtrument, and to lead him into the key of the piece he intends to perform.

VOLUNTEERS, in the military art, perſons who of their own accord, and at their

their own expence, ferve in the army.

VOLUTA, in natural hiftory, a genus of univalve fhells, with an oblong mouth, a clavicle fometimes erect and fometimes depreffed, and fometimes coronated at top. To this genus belong the admiral fhells, tiger fhells, *&c.* See the articles ADMIRAL and TIGER.

VOLUTE, *voluta*, in architecture, a kind of fpiral fcroll, ufed in the ionic and compofite capital, whereof it makes the principal characteriftic and ornament. See IONIC and COMPOSITE.

There are feveral diverfities practifed in the volute. In fome, the lift or edge, throughout all the circumvolutions, is in the fame line or plane; fuch are the antique ionic volutes, and thofe of Vignola. In others, the fpires or circumvolutions fall back; in others, project, and ftand out. Again, in fome, the circumvolutions are oval, in others, the canal of one circumvolution is detached from the lift of another by a vacuity or aperture. In others, the rind is parallel to the abacus, and fprings out from behind the flower thereof. In others, it feems to fpring out of the vafe from behind the ovum, and rifes to the abacus, as in moft of the fine compofite capitals.

VOLVULA, in natural hiftory, the name of an extraneous foffil body, nearly allied to the entrochus, being compofed of the fame fubftance, and being like that of a cylindric column, made up of feveral joints; the commiffures of the joints are, however, much lefs vifible in the volvulæ than in the entrochi, and they are not ftriated, as in the entrochus, from the center to the circumference. See the article ENTROCHUS.

VOLVULUS, in medicine, a name which fome authors give to the iliac paffion, by others called chordapfus, and by others miferere mei. See the article ILIAC.

VOMER, in anatomy, a bone of the upper jaw, fituated between the bones of the palate and the fphenoidal bone, being alfo joined to the procefs of the ethmoides, and part of the lower jaw, and having its forepart, which is fpongy, continued to the middle cartilage of the nofe, and making, in conjunction with it, the feptum nafi. See NOSE and MAXILLA.

VOMICA, in medicine, is commonly taken for a fuppurated impofthume, or an abfcefs with a fuppuration. See ABSCESS, *&c.*

The vomica pulmonum is a latent difeafe of the lungs, which often deceives under a fhew of health. What goes by this name, is a fmall abfcefs feated in fome part of the lungs, and ftraitly inclofed within a bag or membrane. This diforder is moft incident to thofe who are afflicted with a tabes, or labour under an anaftomofis or rupture of a vein in the lungs. In this difeafe, the breath fmells ill long before the vomica breaks; fometimes blood comes up with coughing, the body is perfectly dull and heavy, and the cough very long and troublefome, and fometimes followed by an expectoration of the vomica, in which cafe the patient is feized with no fmall fever, fucceeded by bloody fpit, and a vaft perturbation of body; the confequence of which circumftance may poffibly be a recovery to a good ftate of health. It has often happened that the vomica, by a fudden rupture, has difcharged itfelf into the heart, and occafioned fudden and unexpected death. See PHTHISIS.

*Nux* VOMICA, in pharmacy, a flat, compreffed round fruit, of the breadth of a fhilling, or fomewhat more, and of about the thicknefs of a crown-piece. Its furface is not much wrinkled or corrugated, but fometimes marked with tolerably regular fibres, running from the center to the circumference; it is fomewhat downy or woolly, and of an extreme firm texture, tough like horn, and of a pale greyifh brown colour. It has a fort of umbilicus on each fide of the center, and is more prominent on one fide, and more depreffed on the other; it is very difficultly cut or broken, and leaves a fmooth and gloffy furface behind the knife; it is moderately heavy, and is of a fomewhat paler colour within than on the furface; it has no fmell, but an extremely bitter tafte. We have it only from the Eaft-Indies, whence it is brought with another drug called the lignum colubrinum. It was held by many to be the root of a plant, and by others to be a fungus or an excrement. But it is in reality the nucleus of a fruit of an Eaft-Indian tree, the wood of which is the lignum colubrinum of the fhops. See COLUBRINUM. Some have prefcribed fmall dofes of the nux vomica as a fpecific againft a gonorrhœa, and others againft quartan agues. But we have fo many good and fafe medicines for all thefe purpofes, that there feems no occafion for our having recourfe to fuch as thefe, which fhew fo many figns of mifchief.

There is another fpecies of the nux vomica, defcribed by Breynius, under the name

name of modira caniram, and nux vomica officinarum vera. Commelin determines this tree, not the former, to afford the true nux vomica, and the true lignum colubrinum of the ſhops; and Herman, on the other hand, is as poſitive as to the other. There is alſo another ſort of nux vomica, which is much ſmaller than the former, very like them, and has all their qualities: it is the fruit of another ſpecies of the ſame genus, which is the tree that furniſhes the true officinal wood.

VOMIT, or EMETIC, in pharmacy. See the article EMETIC.

VOMITING, in medicine, a retrograde ſpaſmodic motion of the muſcular fibres of the oeſophagus, ſtomach, and inteſtines, attended with ſtrong convulſions of the muſcles of the abdomen and diaphragm, which, when gentle, create a nauſea; when violent, a vomiting. Theſe convulſive diſorders proceed from the immoderate quantity, or acrimony of the food; from poiſons; from ſome injury of the brain, as a wound, contuſion, compreſſion, or inflammation of that part; from an inflammation of the diaphragm, ſtomach, inteſtines, ſpleen, liver, kidneys, pancreas, or meſentery; from an irritation of the gula; from a diſorderly motion of the ſpirits, by unaccuſtomed agitations in a coach, ſhip, or otherwiſe, or from the idea of ſomething nauſeous.

The two principal curative indications to be obſerved are, firſt, to quiet and compoſe the convulſive and unruly motion of the ſtomach; and, ſecondly, to oppoſe and ſubdue the material cauſes of the diſorder.

The firſt intention is anſwered by corroborating and antiſpaſmodic medicines, ſuch as ſaffron and caſtor, with the teſtaceous powders, as coral, crabs-claws, and oyſter-ſhells; powders compoſed of cinnamon, the leaves of mint, nutmeg, orange-peel, calamus aromaticus, and other ſuch ſimples, are alſo of great ſervice. And if anodynes are found neceſſary, the ſtorax pill, or Sydenham's laudanum, are to be given.

While theſe medicines are taken internally, there may alſo be applied outwardly, to the region of the ſtomach, ſuch things as have power to repreſs its diſorderly motions; of this kind are the oil of mint, nutmeg, and the like, with balſam of Peru: theſe oils may be reduced to a proper conſiſtence, with this balſam, for the ſpreading on leather, and laying on for ſome time. Hungary-water, and other the like ſpirits, are of great uſe alſo, rubbed on with the hand; and to theſe may be added yeaſt, and the ſtrongeſt wine-vinegar applied hot to the part. Finally, an excellent application is balſam of Peru alone, reduced to the conſiſtence of a cataplaſm, with crumb of bread.

The methods to be uſed to remove the material cauſes of the vomiting, are next to be conſidered: if it be of the pituitous kind, and owing to crudities in the primæ viæ, and a viſcid mucus ſticking to them, it is beſt cured by an emetic: if the vomiting of itſelf be found not ſufficient to carry off the ſordes which occaſion it, and the patient continues, after the fits of vomiting, afflicted with a nauſea and heart-burn; in this caſe, a large quantity of warm water, with a little butter, may ſerve the purpoſe; or if this be found inſufficient, a doſe of ipecacuanha is to be given.

VOMITINGS *in Infants*. See INFANT.

VOMITING *of blood*, *vomitus cruentus*, a very dangerous kind of hæmorrhage, conſiſting in a bringing up by vomit of pure and unmixed blood from the ſtomach, and being a method, uſed by nature to throw off a portion of the blood, which moleſts the whole in the vena porta, and by that means to facilitate the circulation of the reſt of the maſs. See the article HÆMORRHAGE.

This diſtemper ſometimes ariſes from internal cauſes, and is regularly periodical, obſerving the ſtated times of the eruptions of the menſes, or other natural diſcharges; ſometimes it ariſes from accidents, ſuch as the giving of violent purging or emetic medicines, or corroſive ones. Among the preceding ſigns of this diſorder, are to be reckoned a ſenſation of ſtraitneſs and anxiety in the præcordia, with tenſion, and involuntary ſighs; with a nauſea or ſickneſs of the ſtomach, and a ſtraining to vomit; which is more violent than in vomiting on any other occaſion; after this the blood is thrown up pure, and the vomiting then ceaſes, till, after a plain ſenſation of more blood being collected in the ſtomach, the efforts to diſcharge it in the ſame manner are again renewed. The quicker the blood is thrown up, after its being diſcharged into the ſtomach, the more fluid and more florid it appears; the longer it is detained there, the blacker and thicker it appears. A vomiting of blood is but an uncommon diſorder. It more frequently attacks women than men; among the

female ſex it is principally ſeen in thoſe whom the menſes have left too early in life, or who have had violent ſuppreſſions of them for a long time. In men, this diſtemper ſeldom ſeizes any but thoſe who have been uſed to periodical diſcharges from the hæmorrhoidal veſſels, and who have had them ſuddenly ſtopped; and they are then uſually firſt attacked with violent pains in the left hypochondrium. People of ſcorbutic habits, and ſuch as have had quartan agues of long ſtanding, have been ſometimes thus affected. And, beſide theſe natural cauſes, people of all ages and ſexes may vomit blood, from external injuries.

A vomiting of blood is ever a dangerous diſorder; for though the quantity of blood thrown up is ſeldom ſo great as to occaſion immediate death, yet it generally degenerates into a tabes in men, and into a cachectic habit in women. It is leſs dangerous to young women, than to any other perſons; and when it is periodical, eſpecially when it obſerves the times of the menſtrual diſcharges, is much leſs dangerous than under any other circumſtances. During the paroxyſm, the proper medicines are powders of nitre, cinnabar, and the abſorbent ſubſtances, ſuch as crab's-eyes, or the like, and afterwards bleeding, cupping, and gentle purges; and diaphoretics are to be given for ſome time.

VOORN, one of the iſlands of Holland, bounded by the river Maes, which divides it from the continent and the iſland of Iſslemunde, on the north; by the ſea called the Bies-boſch, on the eaſt; by another branch of the Maes which divides it from the iſlands of Goree and Overflackee, on the ſouth; and by the German-ſea on the weſt; being about twenty-four miles long, and five broad.

VOPISCUS, a latin term uſed, in reſpect of twins in the womb, for that which comes to the perfect birth; the other being before excluded abortive.

VORTEX, in meteorology, a whirlwind, or ſudden, rapid, and violent motion of the air in gyres, or circles.

Vortex is alſo uſed for an eddy or whirlpool; or a body of water, in certain ſeas or rivers, which runs rapidly around, forming a ſort of cavity in the middle.

Vortex, in the carteſian philoſophy, is a ſyſtem or collection of particles of matter moving the ſame way, and round the ſame axis. See Cartesian.

Such vortices are the grand machines, whereby thoſe philoſophers ſolve moſt of the motions and other phænomena of the heavenly bodies. Accordingly, the doctrine of theſe vortices makes a great part of the carteſian philoſophy.

But this doctrine of vortices is at beſt merely hypothetical. It does not pretend to ſhew by what laws and means the celeſtial motions are really effected, ſo much as by what means they poſſibly might, in caſe it ſhould have ſo pleaſed the Creator. But we have another principle which accounts for the ſame phænomena, as well, nay, better, than that of vortices; and which we plainly find has an actual exiſtence in the nature of things; and this is gravity, or the weight of bodies. See the articles Gravitation, Gravity, &c.

The vortices then ſhould be caſt out of philoſophy, were it only that two different adequate cauſes of the ſame phænomena are inconſiſtent. See the article Newtonian Philosophy.

But we have other objections againſt it. For, 1. If the bodies of the planets and comets be carried round the ſun in vortices, the bodies of the parts of the vortex immediately inveſting them, muſt move with the ſame velocity, and in the ſame direction; and beſides, muſt have the ſame denſity, or the ſame vis inertiæ. But it is evident that the planets and comets move in the very ſame parts of the heavens, with different velocity and in different directions. It follows, therefore, that theſe parts of the vortex muſt revolve at the ſame time in different directions, and with different velocities; ſince one velocity and direction will be required for the paſſage of the planets, and another for that of comets. 2. If it were granted that ſeveral vortices were contained in the ſame ſpace, do penetrate each other, and revolve with divers motions; ſince thoſe motions muſt be conformable to thoſe of the bodies which are perfectly regular, and performed in conic ſections; it may be aſked, how they ſhould have been preſerved entire ſo many ages, and not diſturbed nor confounded by the adverſe actions and ſhocks of ſo much matter as they meet withal? 3. The number of comets is very great, and their motions perfectly regular, obſerving the ſame laws with the planets, and moving in conical orbits which are exceedingly excentric. Accordingly they move every way, and to all parts of the heavens, freely pervading the planetary regions,

regions, and going frequently contrary to the order of the signs; which would be impossible, unless these vortices were away. See the article COMET.

4. If the planets move round the sun in vortices, those parts of vortices next the planets, we have already observed, would be equally dense with the planets themselves, consequently, the vortical matter, contiguous to the perimeter of the earth's orbit, would be as dense as the earth itself; and that between the orbits of the earth and saturn, it must be as dense or denser. For a vortex cannot maintain itself, unless the more dense parts be in the center, and the less dense towards the circumference; and, since the periodical times of the planets are in a sesquialterate ratio of their distances from the sun, the parts of the vortex must be in the same ratio. Whence it follows, that the centrifugal force of the parts will be reciprocally as the squares of the distances. Such, therefore, as are at a greater distance from the center, will endeavour to recede therefrom with the less force. Accordingly, if they be less dense, they must give way to the greater force, whereby the parts nearer the center endeavour to rise. Thus the more dense will rise, and the less dense descend; and thus there will be a change of places, till the whole fluid matter of the vortex be so adjusted, as it may rest in æquilibrio. See the article PLANET, *&c.*

Thus will the greatest part of the vortex, without the earth's orbit, have a degree of density and inactivity, not less than that of the earth itself. Whence the comets must meet with a very great resistance, contrary to all appearances. See the article RESISTANCE.

VOTE, the suffrage or resolve of each of the members of an assembly, where any affair is to be carried by a majority; but more particularly used for the resolves of the members of either house of parliament. See PARLIAMENT.

VOTIVE MEDALS, those on which are expressed the vows of the people for the emperors or empresses. See MEDAL.

VOUCHER, in law, is a person called into court, to make good another's warranty, who is either to defend the right against the demandant, or yield him other lands to the value, *&c.* See WARRANTY.

This extends to lands or tenements of freehold or inheritance, but not to any thing personal or mixed.

Here he that voucheth is called the voucher, and the person that is vouched is called the vouchee. There is also a foreign voucher when the tenant impleaded in a particular jurisdiction, voucheth one to warranty in some other county, out of the jurisdiction of that court, and prays that he may be summoned.

VOUCHER also signifies a receipt or acquittance in cases of account.

VOUTENAI, a town of France, in the dutchy of Burgundy, twenty miles south-east of Auxerre.

VOW, a solemn and religious promise, or oath. See the article OATH.

The use of vows is found in most religions. They make up a considerable part of the pagan worship, being made either in consequence of some deliverance, under some pressing necessity, or for the success of some enterprize. Among the Jews, all vows were to be voluntary, and made by persons wholly in their own power; and if such person made a vow, in any thing lawful and possible, he was obliged to fulfil it. If he appointed no particular time for accomplishing his vow, he was bound to do it instantly, lest by delay he should prove less able, or be unwilling, to execute his promise. Among the romanists, a person is constituted a religious by taking three vows, that of poverty, chastity, and obedience.

VOWS, *vota*, among the Romans, signified sacrifices, offerings, presents and prayers made for the Cæsars and emperors, particularly for their prosperity and the continuance of their empire. These were at first made every five years, then every fifteen, and afterwards every twenty, and were called quinquennalia, decennalia, and vicennalia.

VOWEL, *vocalis*, in grammar, a letter which affords a complete sound of itself, or a letter so simple as only to need a bare opening of the mouth to make it heard, and to form a distinct voice. See the article LETTER.

The vowels are six in number, *viz.* A, E, I, O, U, Y, and are called vowels in contradistinction to certain other letters, which, depending on a particular application of some part of the mouth, as the teeth, lips or palate, can make no perfect sound without an opening of the mouth, that is, without the addition of a vowel, and are therefore called consonants. See the article CONSONANT.

Grammarians reckon also eight semi-vowels, *viz.* F, H, L, M, N, R, S, Z, so denominated because they approach nearer

nearer a vowel in the pronunciation. Of these semi-vowels four, *viz.* L, M, N, R, are called liquid. See LIQUID.

VOX, or VOCEM NON HABERE, in law, a phrase used by Bracton to signify an infamous person.

UPHOLSTER, UPHOLSTERER, or UPHOLDER, a tradesman that makes beds, and all sorts of furniture thereunto belonging, &c.

Upholsters, in carrying on their trade, are to stuff their beds with one sort of dry pulled feathers, and not mix any other therewith, on pain of forfeiting the same, or the value; and their stuffing for quilts is to be clean wool, or flocks, without using any horse-hair, &c. therein, under the like pain. See BED, &c.

UPLAND, denotes high ground, or, as some call it, terra firma, by which it stands opposed to such as is moorish, marshy, or low.

The uplands lie either on the tops of hills, or on their sides, or on the slopes of rising grounds. They sometimes have a sandy soil, sometimes a rocky, gravelly, or loamy one; and sometimes they consist of a tough clay, or a black mould; they are used by the farmers, either for grazing or corn, as they happen to be more moist or more dry; and this difference depends upon their situation and nature. Those lands which lie flat upon the tops of hills, are usually the driest, and those which form the slopes or sides, are generally the moistest, because of the wet that is continually oozing through them. The upland meadows have some disadvantage, as they often need mending or feeding, which those that lie lower do not; but then they make amends for this in their hay, which is always much finer and sweeter than that of the low lands.

UPLAND, a province of Sweden, bounded by the province of Gestricia on the north-west, by the Baltic-sea on the north-east and south-east, and by Sunderland and Westmania on the south and west.

UPPINGHAM, a market-town of England, in the county of Rutland, situated six miles south of Okeham.

UPRIGHT, in architecture, a representation or draught of the front of a building, called also an elevation or orthography. See the article ELEVATION, &c.

UPRIGHT, in heraldry, is used in respect of shell fishes, as crevices, &c. when standing erect in a coat. Inasmuch as they want fins, they cannot, according to Guillim, be properly said to be hauriant, that being a term appropriated to scaly fishes.

UPSAL, a city once the capital of the province of Upland, and of all Sweden, being the only archbishop's see in Scandinavia, and an university, situated in east long. 17° 30′, north lat. 60°.

UPTON, a market-town of Worcestershire, nine miles south of Worcester.

UPUPA, the HOOPOE, in ornithology, a genus of birds with the beak arcuated, convex, compressed and equal, and having a furrow running along each side of it; there is a crest on the head, which is capable of folding back. This is an extremely singular bird, but it is so thick covered with feathers, that it appears large in proportion to its weight; the head is large, and ornamented with an elegant crest; the eyes are small, but very bright and piercing; the tail is between four and five fingers breadth long, in the middle whereof there is an elegant spot of white, of the figure of a new moon; the back is variegated with black and white in an elegant manner; the legs are short, and the outer toe is connected to the middle one some part of the way down, without the help of a membrane.

URACHUS, in anatomy, a membranous canal in the fœtus of quadrupeds in general, of a pyramidal figure, extended immediately from the fundus of the bladder to the navel, and after passing through this, it is by degrees enlarged, and makes its way into the allantois at right-angles each way, or nearly so, and conveys the urine from the bladder into the cavity of this membrane. In the human fœtus, the whole urachus is not pervious, or very rarely so; it is usually found solid, in form of a ligament. It scarce appears probable, therefore, that it serves the office of discharging the urine from the bladder in this as in the former case, and especially as there is no such membrane as the allantois in the human body, nor any cavity formed for the reception of so great a quantity of fluid. See the articles FOETUS, ALLANTOIS, &c.

URANBURG, or URANIBURG, a castle of Denmark, situated on the little island of Huen, in the Sound, sixteen miles north-east of Copenhagen. Here was the celebrated observatory built by that noble Dane Tycho Brahe, and furnished with instruments for observing the course and motions of the heavenly bodies.

URANOSCOPUS, the STAR-GAZER, in ichthyology, a species of trachinus, with nume-

numerous cirri on the under jaw. See the article TRACHINUS.

This fiſh is of an extremely ſingular figure; the body is rounded, a little depreſſed; the back broad, the ſides prominent, and the belly ſomewhat flatted; the head is large and depreſſed; the mouth divided, as it were, into three ſpines under the tongue, and the lower jaw turning upwards; the eyes are large and ſtand near one another, not on the ſides, but on the top of the head, ſo that the fiſh naturally looks ſtraight upward; the iris is of a gold-yellow, the pupil is of a bluiſh-black, the noſtrils have each a double aperture, and are placed at ſome diſtance under the eyes; the whole head, and the coverings of the gills, are beſet with a great number of rough and ſharp tubercles; there are two back fins, the firſt has three prickly rays, the ſecond has fourteen; the pectoral fins have each ſixteen rays, the ventral ones have each five, and the pinna ani has thirteen. See plate CCXCVI. fig. 6.

URBINO, a province of Italy, in the pope's territory, bounded by Romania and the gulph of Venice on the north and eaſt, by the marquiſate of Ancona on the ſouth, and by Tuſcany on the weſt, being ſeventy miles long, and from twenty to fifty broad.

Urbino is alſo the capital of this province.

URDE', or URDE'E, in heraldry. A croſs urdé ſeems to be the ſame with what we otherwiſe call chleche, or chlechée. See the article CHLECHE.

UREDO, the blaſting or blighting of trees or herbs. See the article BLIGHT.

It is ſometimes uſed by phyſicians for an itching or burning of the ſkin.

URENA, in botany, a genus of the monadelphia-polyandria claſs of plants, the corolla whereof conſiſts of five oblong, obtuſe, connated petals, broader than the apex, and narrower at the baſe; the fruit is a round echinated capſule, with five angles, conſiſting of five cells, and made up of five valves; the ſeeds are ſolitary, roundiſh, and compreſſed.

URETERS, ουρητηρες, in anatomy, two membranaceous tubes or pipes, nearly cylindric in figure, and of about the thickneſs of a quill: but their diameter is very uncertain. They ariſe from the kidneys, one from each, and terminate in the urinary bladder. See KIDNEY.

At their origin in the kidneys they are expanded into the form of a funnel, and this expanſion makes the pelvis of the kidneys. See the article PELVIS.

At their termination, which is in the hinder and lower part of the bladder, they paſs obliquely in between its membranes, and open into the bladder by very narrow orifices, and can admit nothing into them from the bladder. They are not ſtraight, but ſomewhat bent, ſo as to reſemble the letter *S*; their ſubſtance is membranaceous, and they are compoſed of three coats: the firſt a common one, from the peritonæum; the ſecond a thin muſcular one; and the third a nervous one, covered with a lubricous humour; and in this there are ſometimes diſcovered glands. The blood-veſſels and nerves come from the adjacent parts.

The uſe of the ureters is to receive the urine ſecreted in the kidneys from the pelvis, and to carry it to the urinary bladder. When theſe are obſtructed, a ſuppreſſion of urine is the conſequence; for there is no other way for the urine to get into the bladder but through them. They are often found of an unnatural ſize, owing to ſtones concreted from among the urine. See the articles BLADDER, URINE, DYSURY, *&c.*

URETHRA, ουρηθρα, in anatomy, a membranaceous tube or canal, of a cylindric figure, ariſing from the neck of the bladder, and continued to the pudendum, ſerving to diſcharge or carry off the urine and ſemen.

The length of the urethra is very different in both ſexes. In man it is twelve or thirteen inches, from the neck of the bladder to the extremity of the glans. It is ſituated in a kind of narrow furrow, formed between the corpora cavernoſa, in the bottom or lower part of the penis. It does not run perfectly ſtraight, but is bent in a very ſingular manner. Its cavity is as large as that of a gooſe-quill. It is compoſed of two robuſt membranes, an exterior and interior; their ſubſtance is thin and tough, and between them there is a ſpongeous or cavernous matter, in which ſome authors pretend to have diſcovered glands, but this is uncertain. The bulb of the urethra is that part of it next to the proſtatæ; it is much thicker than the reſt of the tube, and is about an inch long, and in ſome meaſure reſembles a walnut. It is of a thick and ſpongy texture. The interior ſurface of the urethra, is full of roundiſh and oblong foraminulæ and furrows, out of

of which there may often be preſſed a thick viſcuous fluid, the uſe of which is to lubricate the urethra, and to defend it from the acrimony of the urine. See the articles PENIS, GLANS, &c.

The urethra or urinary paſſage in women, uſually called meatus urinarius, is ſituated ſtraight under the clitoris, and ſhews itſelf by a little eminence. Its length is about two fingers breadth; its diameter is greater than that in man, but ſomewhat narrower at the end than elſewhere. It is capable of great dilatation. There are in it certain little ducts, which convey to its inner ſurface a mucous humour, for lubricating and defending it from the acrimony of the urine, like thoſe in man; but their origin is uncertain.

URGEL, a town of Spain, in the province of Catalonia, capital of the territory of Urgel, ſituated on the river Segra, ſeventy-five miles north of Barcelona.

URI, one of the cantons of Switzerland; bounded by that of Switz, on the north; by Glaris and the Griſons, on the eaſt; by Underwald, on the ſouth; and by the Canton of Bern, on the weſt.

URIM and THUMMIM, among the antient Hebrews, a certain oracular manner of conſulting God, which was done by the high-prieſt dreſſed in his robes, and having on his pectoral, or breaſt-plate. Various have been the ſentiments of commentators concerning the urim and thummim. Joſephus, and ſeveral others, maintain that it meant the precious ſtones ſet in the high-prieſt's breaſt-plate, which by ſome extraordinary luſtre made known the will of God to thoſe who conſulted him. Spencer believes that the urim and thummim were two little golden figures ſhut up in the pectoral as in a purſe, which gave reſponſes with an articulate voice. In ſhort, there are as many opinions concerning the urim and thummim as there are particular authors that wrote about them. The ſafeſt opinion, according to Broughton, ſeems to be, that the words urim and thummim ſignify ſome divine virtue and power annexed to the breaſt-plate of the high-prieſt, by which an oraculous anſwer was obtained from God when he was conſulted by the high-prieſt; and that this was called urim and thummim to expreſs the clearneſs and perfection which theſe oracular anſwers always carried with them; for urim ſignifies light, and thummim perfection; theſe anſwers not being imperfect and ambiguous, like the heathen oracles, but clear and evident. The uſe made of the urim and thummim was to conſult God in difficult caſes relating to the whole ſtate of Iſrael; and ſometimes in caſes relating to the king, the ſanhedrim, the general of the army, or ſome other great perſonage.

URINAL, in medicine, a veſſel fit to receive and hold urine, and uſed accordingly for the convenience of ſick perſons. It is uſually of glaſs and crooked; and ſometimes it is filled with milk to aſſwage the pain of the gravel. See the articles URINE, STONE, and UROCRITERIUM.

URINAL, in chemiſtry, is an oblong, glaſs-veſſel, cloſed for making ſolutions, and ſo called from its reſemblance to the glaſſes in which urine is ſet to ſettle for the inſpection of the phyſician.

URINARIA FISTULA, or URINARY PASSAGE, the ſame with urethra. See the article URETHRA.

URINE, *urina*, a ſerous and ſaline fluid, of a citron-colour, ſeparated from the blood, and carried by the emulgent arteries to the kidneys, from whence it deſcends to the bladder by the ureters, and is, from time to time, emitted thence by the canal of the urethra. See the articles BLOOD, ARTERY, &c.

The urine is therefore the ſeroſity of the blood, but not pure, for it is loaded with ſaline, ſulphureous, and terreſtrial particles, of which it is the menſtruum and the vehicle. The ſides of the bladder are guarded by a mucilaginous fluid, excreted by the glands which are between its coats, by which means the urinous ſalts make the leſs impreſſion upon it. This fluid forms the glair which falls to the bottom of the veſſel when a perſon is afflicted with the ſtone. It is obſervable, that there are three ſorts of ſubſtances differently placed in the urine, *viz.* the nubecula, the enœorema, and the hypoſtaſis. The nubecula is a ſort of a pellicle which ſwims on the top of the urine, and conſiſts of the ſaline and fibrous particles of the blood mixed with the ſeroſity. When it is expoſed to the fire it changes to a cruſtaceous ſubſtance. The enœorema, or ſuſpenſion, is a white, light, ſpongious matter which ſwims in the middle of the urine, conſiſting of particles of a different nature. The hypoſtaſis, or ſediment, is a ſaline, ſulphureous,

phureous, and terreftrial matter, which precipitates to the bottom of the urine. See the article NUBECULA, &c.

The urine of four-footed beafts is troubled and muddy, that of men is more clear and limpid. In infants it is more pale and thick than that of middle-aged perfons. In the very old it is more clear, thin, and has not fo much colour. In hot, bilious conftitutions, it is more of a faffron colour: in the cold and pituitous, pale. Wine drinkers have it of a higher colour, and more thick: in thofe that ufe much exercife it is little and red: in the idle it is pale with a large fediment. After meals it is copious, infipid, light, raw, and without fmell: and after long fafting, it is of a higher colour, acrid, and little. Thofe that fweat much make little water, which is more muddy and yellow. Difeafes caufe a remarkable change in the urine. Light, thin, watry urine, fhews the perfon to be afflicted with internal fpafms, the hyfteric paffion, the hypochondriac pains, the cardialgia, the ftone or gravel, or convulfive colic. In difeafes of the head, fuch as the vertigo, phrenfy, madnefs, melancholy, and epilepfy, the urine is always thin and light. It is likewife the fame in the more grievous afflictions of the nerves from poifon or worms. This ftate of the urine not only happens in the fits, but fome days before and after. See the articles SPASM, HYSTERIC PASSION, &c.

When the urine is thin, aqueous, and always white, it prefages danger in obftinate difeafes: if it is copious in the ftate of fevers, and before the crifis, it portends a phrenfy. In internal inflammations it is always dangerous, the more copious the worfe. After a dyfentery, a fpotted fever, or the fmall-pox, this kind of urine is common. In a cachexy, leucophlegmatia, enormous bleedings in the beginning of an anafarca, in the greenficknefs, in a fuppreffion of the menfes, the urine is crude, turbid, pale, greenifh, or of a light citron-colour, and copious. In all preternatural febrile heats, the urine is yellow or red, and in fmall quantities: fuch kind of urine as is more or lefs red, or thin and light, or thick and heavy, is ufually in intermitting and continual fevers. In the fit, that is, in its exerbation or ftate, the urine is thin, clear, and without fediment. In an ardent and bilious fever, the urine is generally pellucid, but of a flame-colour. In intermittents after the fit, and on the well day, it is thick, and depofits a fediment. If this happens in continual fevers after the crifis, it fhews the fever to be ended. If the fediment is of a rofy or purple-colour, it fhews the blood is in fault, as is evident in continual fevers. When it is intenfely yellow, it difcovers that the bile is in fault. When it is brown or black, there is plenty of black bile, as in a fcorbutic or miliary fever, and in quartans of a dangerous nature. When it is very plentiful, and full of vifcid and crude humours, in replete, obefe, and fpongy bodies, it fhews the obftinacy of an intermitting fever. See the articles DISEASE, FEVER, &c.

As it is a good fign when the urine is thick and depofites a fediment, in fevers; fo, on the contrary, if there is no fediment in intermitting fevers, but the urine continues clear, and lets fall no fediment in the cold fit, it is a very bad fign. If, after the fit, it has no fediment, but is pellucid, it is a very bad omen. In all inflammatory fevers, if the urine is clear and of a purple colour, or brown, and of a deep colour, frothy and without fediment, it is a bad fign. Likewife, it is always obferved, that in a continual fever, if the urine is turbid, and does not grow clear either by the fire or reft, nor depofits a fediment, it is a very dangerous prefage; it is likewife very bad, when in continual fevers, it is thick on the firft days, and in the remainder, efpecially the critical days, it is thin and without fediment. In the decline of catarrhal fevers, and in the fmall pox and meafles, if the urine was clear and aqueous, but is now thick and high-coloured, with a fediment, it is a certain fign that the difeafe remits. See the article INTERMITTING FEVERS.

In confumptions, and all other violent and chronical difeafes, if the urine is thick, high-coloured, and a dark red, with a copious fediment, and a fatnefs fwims upon the urine, and adheres to the fides of the urinal, the body at the fame time wafting away, it is a fign of a flow hectic fever, which is generally fatal. The like danger is threatened when in dropfical perfons the urine is like that of hectics, for its fcarcity is a fign that the lympha is extravafated into fome cavity or porous fubftance; and if the colour is of a deep red, with a grofs fediment, it fhews the inteftine motion and heat diffolves the blood, that the liver is obftructed; whence a bilious fordes is

separated therefrom. See the article CONSUMPTION, &c.

In chronical diseases, without a fever, when the urine is thick, high-coloured, and of a reddish-brown, as well as heavy, as in the confirmed scurvy, gout, scorbutic palsy, and in extreme old age, as also in a nephritic passion, when the pains cease, as well as in the yellow and black jaundice, it shews a plenty of saline and sulphureous excrementitious parts, wherewith the blood and humours abound, and are not duly secreted therefrom, by reason of an obstruction of the liver. Willis has observed, that patients dying of the scurvy have had their livers almost without blood, and like a cow's udder. In some the gall-bladder was either empty or full of stones, or very bitter filth.

When the urine is thick, of a deep colour, and dyes linen yellow, it is a sign that the bile is obstructed, or the duct constricted with a spasm, whence the passage of the bile into the duodenum is hindered; whence it regurgitates by the lymphatic vessels into the blood and lympha, and produces a jaundice. When the colour is of a brownish-black, it is a sign of the black jaundice, which proceeds from an impeded secretion of the bile in the liver. See JAUNDICE.

Sometimes the urine is imbuted with an oily matter, and is made without noise, there are various colours on the surface, chiefly bluish, and it adheres so strongly to the sides of the urinal, that it cannot be washed off with a lixivious liquor. This is a sign of the colliquation of the fat: it shews a consumption, an atrophy, and an hectic. Sometimes it is observable in fevers, and the oleous matter is more plentiful in proportion to the fatness of the body. See ATROPHY, &c.

When the urine abounds too much with a tartarious matter, which is known by its adhering to the sides of the chamber-pot, it is a sign of a disposition to the gravel and stone. When there is a small sand in the urine, it shews those disorders to be actually present. Sometimes shining yellow crystals are seen on the sides of the pot, which is a sign of arthritic or rheumatic pains. When the urine is bloody or whitish, from a mixture of pus loaded with a glutinous, thick, tenacious matter, of a bad smell, which sinks to the bottom, and does not dissolve by the agitation of the vessel, it is a certain sign of an ulcer in the kidneys or bladder. Sometimes, in the stone and ulcer of the bladder, it is like the white of an egg, and so tenacious that it will not divide, but fall from the vessel at once. See the article STONE.

In a chronical and malignant gonorrhœa, not only the prostatæ, but often the bladder is ulcerated; whence a thick and turbid urine, with a copious sediment, which when thrown on the coals has a most fetid smell. Likewise, in the stone in the bladder, this, or its sphincter, is so eroded that the urine is thick and branny, with small caruncles and filaments, which the vulgar take for worms. In the strangury there is a frequent stimulus to make water, which is little and muddy, sharp and salt, with filaments; and then there is some spasmodic disorder affects the sphincter. If blood is mixed with the urine, like the washings of flesh or red-wine, but falls to the bottom of a purple colour, it proceeds from the kidneys; but if it be of a brownish-black, it comes from the veins of the bladder.

*Incontinence of* URINE. This is a term used by medical writers to express an involuntary excretion of this liquor, whether it be incessantly, or in larger quantities at different intervals. This is of two kinds: in the one it is only in the night, in the time of sleep; and this arises merely from carelessness, and a bad habit: in the other, it depends on a paralytic affection of the sphincter of the bladder; and in this case it drops away continually from the patient; and this is therefore called by some a stillicidium. Authors also divide an incontinence of urine into the idiopathic and symptomatic: the idiopathic is a disease in itself, and depends upon the preceding causes; the symptomatic happens to different persons on different occasions, as a symptom of other complaints. It is common to dying persons; it is also very frequent to women who are big with child, and sometimes happens from violent sneezing, coughing, or laughing. The voiding of the urine involuntarily, and in the sleep, in infants, is not to be accounted a disease; but when this custom continues with them as they grow up, from idleness, or ill habit, it is at length to be considered as a disease, as they are by no means able to help it. Women who have suffered much in childbirth are often subject to an incontinence of urine afterwards, especially persons who have had their first child at an advanced age. People in years, who are

ſubject to paralytic complaints, are alſo often afflicted with this troubleſome complaint; and many who have been cut for the ſtone by perſons not ſufficiently ſkilled in the operation. Perſons ſubject to the piles alſo ſometimes fall into it, from the ſuppreſſions of their uſual diſcharges, and ſometimes from the tumours becoming fiſtulous, and reaching to the neck of the bladder. Impoſthumes of the bladder will alſo occaſion it, and violent external injuries.

An incontinence of urine, which happens only in the night, and is merely cauſed by a bad habit, and not of long ſtanding, uſually admits of a cure; but the ſtillicidiums of urine, from paralytic diſorders of the ſphincter of the bladder, are very rarely cured, eſpecially when they have been fixed ſome time upon the perſon. The involuntary voiding the urine in the night, in children, is to be cured, in a great meaſure, with puniſhment for the neglect, and by denying them much liquids after dinner-time; by a proper diet; the avoiding all diuretics, and the making water immediately before going to bed; and when it has gone ſo far, that the tone of the parts is injured, the uſual ſtrengthening medicines are to be given, as in the following caſes. When the incontinence of urine is occaſioned by a paralytic weakneſs of the ſphincter, nervous and ſtrengthening medicines are the proper method of curing; in this caſe, maſtic, amber, nutmeg, and cinnabar, are found to be of great ſervice, and pills or powders compounded of them, are an excellent general remedy to be given in ſmall doſes, two or three times a day. Externally, it is very proper to uſe by way of fomentation, decoctions of roſemary, ſage, ſerpyllum, marjoram, and the like warm herbs in red wine. When the diſeaſe is occaſioned by an impoſthume or ulcer in the neck of the bladder, balſamics are to be given, as maſtic, gum-juniper, and boiled turpentine; but when it is owing to injuries received in child-birth, the manual operation of the ſurgeon is uſually to be preferred to all internal medicines.

*Bloody* URINE, or voiding blood by urine. See the article HÆMORRHAGE *of the urinary paſſages.*

*Difficulty, or ſuppreſſion, of* URINE. See the articles DYSURY, ISCHURY, *&c.*

When the urine of children is ſuppreſſed by viſcid humours which obſtruct the kidneys, or from the relaxed tone of the bladder, or from ſpaſmodic conſtrictions, producing pains, convulſions, and other diſorders, you may give them half a ſcruple of ſome neutral ſalt, ſuch as tartar vitriolate, arcanum duplicatum, and the like; or the ſame quantity of the ſeeds (Ray ſays the flowers) of muſcus clavellatus, lycopodium, or club-moſs, in parſley-water; it being diuretic and antiſpaſmodic. The pubes may likewiſe be anointed with oil of juniper mixed with oil of amber and ani-ſeed; and then a cataplaſm of roaſted unions may be laid on hot. Theſe things are likewiſe good when there is ſmall ſtones, which they expel. But if theſe fail, and the ſymptoms are urgent, a catheter muſt be introduced into the bladder; which is much eaſier in girls than boys. See the article STONE.

For the diabetes, or that diſeaſe wherein the urine comes away crude, exceeding the quantity of the liquids drank, ſee the article DIABETES.

URINE, in agriculture, is of excellent uſe as a manure; and for land, trees, *&c.* is preferable to dung; as penetrating better to the roots, and removing divers infirmities of plants.

URINOUS SALTS, are the ſame with what we otherwiſe call alkali ſalts, or alkalies. See the articles SALT and ALKALI.

URN, *urna*, a kind of vaſe, of a roundiſh form, but biggeſt in the middle, like the common pitchers, now ſeldom uſed but in the way of ornament over chimney-pieces, in buffets, *&c.* The great uſe of urns among the antients was to preſerve the aſhes of the dead after they were burnt; for which reaſon they were called cineraria, and urnæ cinerariæ, and were placed ſometimes under the tomb-ſtone whereon the epitaph was cut; and ſometimes in vaults in their own houſes. Urns were alſo uſed at their ſacrifices to put liquid things in.

URN was alſo a roman meaſure for things liquid. See the article MEASURE.

UROCRITERIUM, a caſting of water; or giving judgment on diſeaſes by the ſight of the urine. See URINE.

UROGALLUS, in ornithology, a ſpecies of the tetrao. See TETRAO.

The urogallus is of two kinds; the firſt being the urogallus, or tetrao major, with a white ſpot on the baſe of the wing, is otherwiſe called the cock of the mountain, being a very large and noble bird, nearly of the bigneſs of the turkey, and much reſembling it in figure, only that it

is not so unweildy: the head is large and rounded: the beak is short, a little hooked at the point: the eyes are large, and there is a naked space over them by way of eye-brow, which is of a fine bright scarlet.

For the urogallus, or tetrao minor, otherwise called grouse, see GROUSE.

URSA, the BEAR, in astronomy, a name common to two constellations of the northern hemisphere, near the pole, distinguished by major and minor. The ursa major, or the great bear, according to Ptolemy's catalogue, consists of thirty-five stars: according to Tycho's, of fifty-six: but in the britannic catologue we have two hundred and fifteen.

The ursa minor, or little bear, called also Charles's wain; and by the Greeks cynosura; by its neighbourhood to the north pole, gives the denomination αρκτος, bear, thereto. Ptolemy and Tycho make it to consist of eight stars, but Flamstead of fourteen.

URSULINES, in church history, an order of nuns, founded originally by St. Angela of Brescia, in the year fifteen hundred thirty-seven, and so called from St. Ursula, to whom they were dedicated. They observe the rules of St. Augustine, and are chiefly noted for taking on them the education and instruction of young maids: their monasteries are a kind of schools where young ladies of the best families receive their education. The habit of these religious is a gown of black serge, or other stuff, tied about with a girdle of black leather. The ursulines are spread chiefly over France and Italy; and their different observances in their several monasteries make them in truth so many distinct religious orders.

URSUS, the BEAR, in zoology. See the article BEAR.

URTICA, the ROMAN NETTLE, in botany, a genus of the monoecia tetrandria class of plants, having neither corolla nor pericarpium: the cup is connivent: the seed is single, ovated, obtuse, compressed and shining. See NETTLE.

URTICA MARINA, the SEA-NETTLE, in ichthyology, a species of Medusa, with four cavities on the under surface. See the article MEDUSA.

This appears, as floating on the water, to be a mere lifeless lump of jelly: it is of a whitish colour, with a cast of bluish-grey, and is of an orbiculated figure, elevated into a convexity in the middle on the upper side, flat on the under, and furnished with a fringe of fine, and somewhat rigid, filaments round the edge, resembling white hairs: on the under surface there are four cavities near the center, each of an arcuated figure, and surrounded with an opake line formed of about twenty-four parallel points or dots. From the very center of the under side there arise four crooked appendages, which have each a row of hairy filaments on the exterior edge; and on the upper surface there is an appearance of fine vessels of a pale colour.

USAGE, in law. See the articles PRESCRIPTION and CUSTOM.

USAGE, in language. See LANGUAGE.

USANCE, *uso*, in commerce, is a determinate time fixed for the payment of bills of exchange, reckoned either from the day of the bills being accepted, or from the day of their date; and thus called because regulated by the usage and custom of the places whereon they are drawn. See BILL *of exchange*.

Bills of exchange are drawn at one or more usances, either from sight or from date. The term is longer or shorter, according to the different countries. Usance from London to any part of France, is thirty days; (this being declared to be a month, in regard to exchanges, in this kingdom) whether the month has more or fewer in it. Usance from London to Hamburgh, Amsterdam, Rotterdam, Middleburgh, Antwerp, Brabant, Zealand, and Flanders, and from these places to London, is one calendar month after the date of the bill. Usance, from London to Spain and Portugal, and from these places to London, is two calendar months after date. Usance from London to Genoa, Leghorn, Milan, Venice, and Rome, and from these places to London, is three months. See EXCHANGE.

Usance of Amsterdam upon Italy, Spain, and Portugal, is two months: upon France, Flanders, Brabant, Geneva, and upon any place in the seven United Provinces, is one month. Upon Francfort, Nuremburgh, Vienna, Ausburgh, Cologne, Leipzic, and other places of Germany, as also upon Hamburgh and Breslaw, is fourteen days after sight; two usances twenty-eight, and half usance seven.

Usance from Dantzic, Coningsberg, and Riga, upon Amsterdam, is at one month after sight; though it is common to draw from the first at forty days date, and from the others at forty-one, but oftener at

ten and eleven. And from Amſterdam on the ſaid places at a month's date, without mentioning uſance; tho' ſometimes at forty and forty-one days; and ſometimes on Breſlaw at ſix weeks date. Moſt nations have generally agreed to allow the acceptor of a bill ſome ſmall time for payment beyond that mentioned in the bill, termed days of grace or reſpite; but they generally diſagree in the number and commencement of them. See the article DAYS *of grace*.

USE, in law, the profit or benefit of lands and tenements; or a truſt and confidence repoſed in a perſon for the holding of lands, *&c.* that he to whoſe uſe the truſt is made ſhall receive the profits.

Uſes may be limited to a perſon and the wife he ſhall marry; and if the parties to a deed agree, and declare, that one of them ſhall make a feoffment, or levy a fine, to the uſe and intent that he ſhall hold the lands for his life, and after his deceaſe another intail, and afterwards a third in fee ſimple, *&c.* the eſtate ſettles according to the uſes in the deed.

The conveyances to uſes are ſaid to be of three ſorts, *viz.* a covenant to ſtand ſeized; a feoffment, fine or recovery to uſes; and a bargain and ſale; which laſt a contingent uſe cannot be ſupported by, though it may by the two firſt.

A ſuperſtitious uſe, is where lands or goods are deviſed to a prieſt to pray for the ſouls of the dead, *&c.* in which caſe they become forfeited to the king: and where ſuch an uſe is void, and the king cannot have the land, it ſhall not reſult to the heir at law; but it may be applied to charity.

USES *and cuſtoms of the ſea*, are certain maxims or rules which form the baſis of the maratime juriſprudence, by which the policy of navigation, and the commerce of the ſea are regulated. See the article NAVY, *&c.*

Theſe uſes and cuſtoms conſiſt of three kinds of regulations: the firſt called the laws or judgments of Oleron; the ſecond, regulations made by the merchants of Wiſbuy, a city in the iſland of Gothland, in the Baltic, antiently much famed for commerce; and the third, a ſet of regulations made at Lubec, by the deputies of the Hanſe Towns. See the articles OLERON, HANSE, *&c.*

USEDOM, an iſland of Pomerania, in Germany, ſituated at the mouth of the river Oder, in the Baltic-ſea: ſubject to the king of Pruſſia.

USHANT, an iſland of France, fifteen miles weſt of the coaſt of Britany, at the entrance of the Britiſh-channel.

USHER, an officer, or ſervant, who has the care and direction of the door of a court, hall, chamber, or the like.

In the king's houſhold there are two gentlemen uſhers of the privy-chamber appointed to attend the door, and give entrance to perſons that have admittance thither; four gentlemen-uſhers, waiters; and eight gentlemen-uſhers, quarter-waiters in ordinary.

USHER alſo ſignifies an officer of the court of Exchequer, of which there are four who attend the barons and chief officers of that court at Weſtminſter, as alſo juries, ſheriffs, *&c.* at the pleaſure of the court. There is alſo an uſher of the court of chancery.

USHER *of the black rod*, the eldeſt of the gentlemen-uſhers, daily waiters at court, whoſe duty is to bear the rod before the king at the feaſt of St. George, and other ſolemnities: he has alſo the keeping of the chapter-houſe door, when a chapter of the order of the garter is ſitting, and in time of parliament attends the houſe of peers, and takes delinquents into cuſtody. He wears a gold-badge embelliſhed with the enſigns of the order of the garter. See the article *Black* ROD.

USK, a river of Wales, which riſes on the weſt of Brecknockſhire, and runs ſouth-eaſt through that county and Monmouthſhire, falling into the mouth of the Severn.

USNEA, in botany, a genus of moſſes, wholly deſtitute of leaves, and compoſed only of long ſlender filaments or ſtalks, which are uſually ſolid, rigid, and of a cylindric figure. The extremities, or other parts of theſe, are at times furniſhed with a ſort of orbicular bodies, dry and deſtitute of uſe, but ſeeming to ſupply the place of flowers. Theſe are hollow, in form of cups, but have no rim. The whole plants are fixed in the manner of miſletoe to the barks of trees. Micheli has given accounts of flowers and ſeeds in theſe plants; but Dillenius ſuſpects the accuracy of this obſervation, and adds, that if there are ſuch, they are too minute to be of any ſervice in the general diſtinctions of the plants.

USQUEBAUGH, a ſtrong compound liquor, chiefly taken by way of dram.

There are ſeveral different methods of making this liquor; but the following is eſteemed one of the beſt: To two gal-

lons of brandy, or other spirits, put a pound of spanish-liquorice, half a pound of raisins of the sun, four ounces of currants, and three of sliced dates; the tops of baum, mint, savory, thyme, and the tops of the flowers of rosemary, of each two ounces; cinnamon and mace, well bruised, nutmegs, aniseeds, and coriander-seeds, bruised likewise, of each four ounces; of citron, or lemon and orange-peel, scraped, of each an ounce: let all these infuse forty-eight hours in a warm place, often shaking them together: then let them stand in a cool place for a week: after which the clear liquor is to be decanted off, and to it is to be put an equal quantity of neat white port, and a gallon of canary; after which it is to be sweetened with a sufficient quantity of double-refined sugar.

USTION, in pharmacy, the preparing of certain substances by burning them.

USTULATION, *ustulatio*, a word used by pharmaceutic writers to express the roasting or torrefying of humid or moist substances over a gentle fire, so as to render them fit for powdering. The same word is also used by some for what we call burning of wine.

USUCAPTION, *usucaptio*, in the civil law, is an acquisition of the property of a thing, by a possession and enjoyment thereof for a certain term of years prescribed by law.

USUFRUIT, *usus fructus*, in the civil law, the use or enjoyment of any lands or tenements; or the right of receiving the fruits and profits of an inheritance, or other thing, without a power of alienating or changing the property thereof.

USURER, a person charged with a habit or act of usury. See the article USURY.

USURIOUS CONTRACT, is any bargain or contract whereby a man is obliged to pay more interest for money than the statute allows.

USURPATION, in law, is an injurious using or enjoyment, of a thing for continuance of time, that belongs of right to another.

USURY, *usura*, in the general, denotes a gain or profit which a person makes of his money, by lending the same; or it is an increase of the principal, exacted for the loan thereof; or the price a borrower gives for the use of a sum credited to him by the lender, called, also, interest; and, in some antient statutes, dry-exchange, See the article EXCHANGE.

The word usury is generally taken in an evil sense, *viz.* for an unlawful profit which a person makes of his money; in which sense it is, that usury is forbidden by the civil and ecclesiastical, and even by the law of nature.

By stat. 12 Ann. c. 16. which is called The Statute against Excessive Usury, it is ordained, that no person shall take for the loan of any money, or other thing, above the value of five pounds for the forbearance of one hundred pounds for a year; and so in proportion for a greater or lesser sum: and it is declared, that all bonds, contracts, and assurances, made for payment of any principal sum to be lent on usury, above that rate, shall be void; and that whosoever shall take, accept, or receive, by way of corrupt bargain, loan, *&c.* a greater interest than that last above-mentioned, shall forfeit treble the value of the money lent; and also, that scriveners, solicitors, and drivers of bargains, shall not take or receive above five shillings for the procuring the loan of one hundred pounds for one year, on pain of forfeiting twenty pounds, *&c.*

There can be no usury without a loan, between which and a bargain the court has distinguished: and though a person is to pay double the sum borrowed, *&c.* by way of penalty, for the non-payment of the principal debt, it is not usury; so it also is in respect to the grant of an annuity for lives, or on condition, where it exceeds the usual interest, and the proportion attending contracts of this kind. Even if one secures a large interest and principal, and it is at the will of the party who is to pay; or where it happens that both the principal money and extraordinary interest are in hazard, or that a person may have less than his principal; as when a bond is made to pay money upon the return of a ship from sea, *&c.* either of these cases are not held to be usury.

In an action brought for usury, the statute made against it must be pleaded; and in pleading an usurious contract, as a bar to an action, the whole matter is to be set forth specially, because it lies within the party's own privity; yet on an information on the statute for making such contract, it is sufficient to mention the corrupt bargain generally; because matters of this kind are supposed to be privily transacted; and such information may be brought by a stranger. 1 Hawk. P. C. 248. Likewise upon an information on the

the ſtatute againſt uſury, he that borrows the money may be a witneſs, after he has paid the ſame.

UT, a latin term ſignifying literally *as*, much uſed in ſtating of ratios and proportions. See the articles RATIO and PROPORTION.

Sir Iſaac Newton aſſigns its uſe thus: if in determinate quantities of divers kinds be compared together, and one of them be ſaid to be *ut*, *as*, any other directly or inverſely, the meaning is, that the firſt is increaſed or diminiſhed in the ſame ratio as the latter: and if one of them be ſaid to be *ut*, *as*, two or more others directly, or inverſely, the meaning is, that the firſt is increaſed or diminiſhed in a ratio compounded of the ratios, in which the others are increaſed or diminiſhed. Thus, if A be ſaid to be *as*, B directly, and *as* C directly, and *as* D inverſely, the meaning is, it is increaſed or diminiſhed in the ſame ratio with $B \times C \times \frac{1}{D}$, that is, A and $\frac{BC}{D}$ are to each other in a given ratio.

UT, in muſic, the firſt of the muſical notes, which, with the reſt, was taken out of the hymn of St. John Baptiſt. *Ut queant laxis*, &c. See SCALE, MUSIC, *&c.*

UTENSIL, *utenſile*, a little domeſtic moveable, belonging principally to the kitchen: ſuch are pots pans, *&c.*

Utenſils are more particularly uſed in war, for the moveables which the hoſt is obliged to furniſh the ſoldiers, quartered with him; which are, a bed with bedclothes, a pot, and a ſpoon.

UTERINE, *uterinus*, ſomething belonging to the uterus, or womb of a woman.

*Furor* UTERINUS, in medicine, denotes a kind of madneſs, attended by laſcivious ſpeeches and geſtures, and an invincible inclination to venery. See FUROR.

UTERUS, the WOMB, in anatomy, a hollow body, called alſo the matrix, of a form approaching to that of a pear, ſituated between the bladder and the rectum, and deſtined to the office of generation, for the containing the fœtus. It is connected in the anterior part with the vagina, and at its lateral part by the ligaments, lata and rotunda, being looſe in its hinder part.

In women not with child, the length of the uterus is about three inches; its breadth, in the upper part, being about two inches, and in the lower part one. Its thickneſs is about an inch and an half: in virgins, indeed, it is much ſmaller than this; but in women with-child it is of a different ſize, according to the different time of geſtation.

Anatomiſts divide it into two parts; the upper and broader part they call the fundus uteri, and the lower they call the cervix, into which it is that the vagina opens. See the article VAGINA.

The orifice, or, as it is otherwiſe called, the internal mouth of the womb, opens into the vagina, in form of the glans penis in man: it is very ſmall in virgins, but in women who have had children, or who are with child, it is larger; and in the laſt it is always cloſed up with a glutinous humour: in the time of delivery, it in a wonderful manner expands itſelf, ſo as to give paſſage to the child. See the article DELIVERY.

The ſubſtance of the womb is maſculous, being compoſed of a various plexus of fleſhy fibres, with a great number of veſſels between. In women not with-child it is compact and firm; in thoſe with child it is ſpongy and ſinuous, and is capable of wonderful dilatation, with out any diminution of its thickneſs. It is covered externally with a membrane from the peritonæum; and internally, its cavity is lined with a porous and nervous membrane: this cavity is very ſmall in virgins; and in women with child the inner membrane almoſt entirely diſappears.

The blood veſſels of the uterus are tortuous, and make a thouſand anaſtomoſes with one another: they open by a number of little mouths into the uterus and vagina, and are the ſources of the menſtrual diſcharge in women. See the article MENSES.

The arteries are of three kinds, *viz.* ſpermatics from the aorta; very large ones from the hypogaſtrics; and others from the hæmorrhoidal arteries. The veins of the uterus are alſo of three kinds, and of the ſame denominations: they have valves, and are greatly larger than the arteries, eſpecially in women with-child. The nerves of the womb are from the intercoſtals, and thoſe of the os ſacrum. The lymphatics have long ſince been diſcovered in brutes; but Morgagni has of late years found them alſo in human ſubjects. See the articles ARTERY, VEIN, NERVE, *&c.*

UTILE, a latin term, fignifying profitable or ufeful; in which fenfe it is fometimes ufed by englifh writers.

UTOXETER, a market-town of Staffordfhire, twelve miles fouth-eaft of Stafford.

UTRECHT, the capital of a province of the fame name, in the united Netherlands, fituated twenty-three miles fouth-eaft of Amfterdam.

UTRICULARIA, in botany, a genus of the diandria-monogynia clafs of plants, with a ringent, bilabiated, monopetalous flower; and its fruit a large, globofe, and unilocular capfule, containing a number of fmall feeds.

UVA URSI, in botany, a name ufed by Tournefort for a fpecies of arbutus. See the article ARBUTUS.

UVEA, in anatomy, the third or outermoft coat of the eye. See EYE.

VULCANO, or VOLCANO, in natural hiftory, a burning mountain, or one that vomits forth fire, flame, afhes, cinders, &c. See the article MOUNTAIN.

As to the caufe of vulcanos, it is found by experience, that there are feveral inflammable bodies, which, being mixed together in due proportion, will kindle into flame by fermentation alone, without the help of any fiery particles. Thus M. Lemery having covered up in the earth about fifty pounds of a mixture, compofed of equal parts of fulphur and filings of iron, tempered with water; after eight or nine hours time, the earth, where it lay, vomited up flames. From this experiment we fee the true caufe of the fire of Ætna, Vefuvius, and other burning mountains, which probably are made up of fulphur and fome other matter proper to ferment with it, and take fire. See ÆTNA, VESUVIUS, &c.

VULGATE, a very antient latin tranflation of the Bible, and the only one the church of Rome acknowledges authentic. See the article BIBLE.

The antient vulgate of the Old Teftament was tranflated almoft word for word from the greek of the LXX. The author of the verfion is not known, nor fo much as gueffed at.

VULGATE *of the New Teftament.* This the romanifts generally hold preferable to the common greek text, in regard it is this alone, and not the greek text, that the council of Trent had declared authentic. Accordingly that church has, as it were, adopted that edition. The priefts read no other at the altar, the preachers quote no other in the pulpit, nor the divines in the fchools.

VULNERARY, in medicine, an epithet given to remedies proper for the cure of wounds and ulcers.

All medicines of this intention are fuppofed both to cleanfe and heal; that is, incarnate, or fill up with new flefh, all ulcerations and foulneffes. Under this head are ranged all fuch balfamics as are not only foftening and adhefive, but alfo, by a peculiar activity, joined with a fuitable configuration of parts, are apt to abrade and carry along with them what particles they lay hold on in their paffage.

VULPES, the FOX. See the article FOX.

VULTURE, a genus of birds, the characters of which are as follow: there are four toes on each foot, and three of thefe are placed forwards; the neck is long, and almoft bare of feathers; the legs are covered with feathers down to the feet, or nearly fo; and under the throat there is a fpace covered with hairs inftead of feathers; the head alfo, in many fpecies, is naked, and has at the moft only a downy matter on it, inftead of feathers; and the under part of the wings is downy.

This genus comprehends the black vulture, the bœtic vulture, the hare-catcher, the golden-breafted vulture, the brown vulture, and brafilian vulture.

VULVA, in anatomy, a name given as well to the uterus, or womb, as to the cunnus, or pudendum muliebre. See the articles UTERUS and PUDENDUM.

UVULA, in anatomy, a round, foft, fpongious body, like the end of a child's finger, fufpended from the palate, near the foramina of the noftrils, perpendicularly over the glottis. Its ufe is to break the force of the cold air, and prevent its entering too precipitately into the lungs. It is formed of a duplicature of a membrane of the palate; and is called, by fome authors, columella, and by others gurgulio.

It is moved by two pair of mufcles, and fufpended by as many ligaments.

*Prolapfus* UVULÆ. See the article PROLAPSUS.

UVULARIA, in botany, a genus of the hexandria-monogynia clafs of plants, the flower of which confifts of fix very long lanceolated petals; and its fruit an ovato-oblong trilocular capfule, containing feveral roundifh and compreffed feeds.

UXBRIDGE, a market-town of Middlesex, situated on the river Colne, fifteen miles west of London.

UXOR, among chemists, signifies the mercury of metals. See the articles MERCURY and METAL.

UXORIUM, in antiquity, a fine or forfeit paid by the Romans, for not marrying. See the article MARRIAGE.

UZBECK, or OUSBECK, TARTARY, a large country of Asia, bounded by Calmuc Tartary on the north, by Tibet on the east, by India and Persia on the south, and by a great desart, which separates it from the Caspian sea, on the west.

UZES, a town of Languedoc, in France, sixteen miles north of Nismes.

UZIFIR, UZUFAR, or UZIFUR, in chemistry, a name which some authors give to cinnabar. See the article CINNABAR.

# W.

W, or w, is the twenty-first letter of our alphabet, and is composed, as its name implies, of two v's. It was not in use among the Hebrews, Greeks, or Romans, but chiefly peculiar to the northern nations, the Teutones, Saxons, Britons, &c. But still it is not used by the French, Italians, Spaniards, or Portuguese, except in proper names and other terms borrowed from languages in which it is originally used, and even then it is sounded like the single v. This letter is of an ambiguous nature, being a consonant at the beginning of words, and a vowel at the end. It may stand before all the vowels except *u*, as *water*, *wedge*, *winter*, *wonder*: it may also follow the vowels, *a*, *e*, *o*, and unites with them into a kind of double vowel, or diphthong, as in *saw*, *few*, *cow*, &c. It also goes before *r*, and follows *s* and *th*, as in *wrath*, *swear*, *thwart*; it goes before *h* also, though in reality it is sounded after it, as in *when*, *what*, &c. In some words it is obscure, as in *shadow*, *widow*, &c.

WAAG, a river of Hungary, which rises in the Carpathian mountains, on the confines of Poland, and running first from east to west, then turns south, and passing by Leopoldstadt, falls into the Danube, opposite to the island of Schut.

WAAL, a river of the United Netherlands, being one of the branches of the Rhine, which runs from east to west, thro' the Betue, in the province of Gelderland, passing by Nimeguen, Tiel, Bommel, and Gorcum, and, continuing its course eastward, unites its waters with the Maes, and, passing by Dort, falls into the German sea below the Briel.

WADD, or WADDING, is a stopple of paper, hay, straw, or the like, forced into a gun upon the powder, to keep it close in the chamber; or to put up close to the shot, to keep it from rolling out. See the article GUN, &c.

WAFE. See the article WAIF.

WAFT. To waft a ship, is to convoy her safe, as men of war do merchant ships. To make a waft, is to hang out some coat, sea-gown, or the like, on the main-shrouds of the ship, as a signal for people to come aboard, and signifying that the ship is in great distress.

WAFERS, or *Sealing* WAFERS, are made thus: take very fine flour, mix it with glair of eggs, isinglass, and a little yeast; mingle the materials; beat them well together, spread the batter, being made thin with gum-water, on even tin-plates, and dry them in a stove; then cut them out for use.

You may make them of what colour you please, by tinging the paste with brazil or vermilion for red; indigo or verditer, &c. for blue; saffron, turmerics, or gamboge, &c. for yellow.

Wafers, on importation, pay a duty of $4\frac{78\frac{3}{4}}{100}$d. the pound, and draw back on exportation $4\frac{31\frac{1}{4}}{100}$d. the pound.

WAGE, in law, denotes the giving security for the performance of any thing.

WAGER *of law*, is used where an action of debt is brought against a person, upon a simple contract between the parties, without deed or record, and the defendant, in presence of his compurgators, swears in court, that he owes the plaintiff nothing, in form and manner as he has de-

declared: and here the reason of waging of law is, because the defendant may have paid to the plaintiff his debt in private, or before witnesses who may be all dead, and therefore the law allows him to wage his law in discharge; and in that case, his oath shall be accepted to discharge himself, rather than the law will suffer him to be charged upon the bare allegation of the plaintiff. The method of waging law is this, *viz.* the defendant generally brings six compurgators with him into court, and stands at the end of the bar towards the right hand of the chief justice; the secondary asks him, whether he will wage his law? whereto if he answers that he will, the judges admonish him to be well advised, telling him the danger of taking a false oath; and if he still persists, then the secondary says, and the defendant, who wages his law, repeats after him, "Hear this, ye justices, that I C. D. do not owe to A. B. the sum of , nor any penny thereof, in manner and form as the said A. B. has declared against me: so help me God." After the defendant has thus sworn, and the compurgators given in, upon oath, that they believe he swears true, the plaintiff is for ever barred; it being as much as if a verdict had passed against him.

WAGGON, a vehicle or carriage, of which there are various forms, accommodated to the different uses they are intended for. The common waggon consists of the shafts or rads, being the two pieces which the hind horse bears up; the welds; the slotes, or cross-pieces, which hold the shafts together; the bolster, being that part on which the fore wheels and the axle-tree turn, in wheeling the waggon a-cross the road; the chest, or body of the waggon, having the staves or rails fixed thereon; the bales, or hoops, which compose the top; the tilt, the place covered with cloth, at the end of the waggon. For the principles on which this carriage is constructed, see WHEEL.

WAGGON-*master-general*, in the military art, is he who has the ordering and marching of the baggage of the army. On a day of march he meets the baggage at the place appointed in the orders, and marshals it according to the rank of the brigade or regiment each waggon belongs to, which is sometimes in one column, sometimes in two; sometimes after the artillery; and sometimes the baggage of each column follows their respective column.

WAGININGEN, a town of the United Provinces, in the province of Guelderland, situated on the river Leech, eight miles north-west of Nimeguen.

WAGRIA, the eastern division of the dutchy of Holstein, in the circle of Lower Saxony, in Germany, bounded by the Baltic sea on the north, east, and south.

WAGTAIL, in ornithology, the name of two different species of motacilla. See the article MOTACILLA.

The white or common wagtail is the motacilla with a black breast. This is a very beautiful bird, much about the size of the goldfinch, but the body is longer in proportion, and much better covered with feathers; the head is large and rounded; the eyes are large, and their iris hazel; the beak is strait, slender, moderately long and black; the beak and the eyes are surrounded with a space of white, which is continued in a broad line down almost to the wings; the crown of the head, both sides of the neck, and back are black, the breast and belly are white; the tail is long, and both that and the wings are variegated with black and white. See plate CCXCVI. fig. 3.

The other species is the yellow wagtail, or the yellow-breasted motacilla, much resembling the former, only that the breast and belly are yellow; the sides of the head variegated with some strokes of yellow, and the wings with white.

WAIF, or WAFE, in law, a term applied to such goods as a thief having feloniously stolen, on his being closely pursued, are waved or left by the felon, which become forfeited to the king, or lord of the manor: and so it also is, where a felon has the goods in his custody, and apprehending that pursuit is made, he flies, and leaves them behind him. Tho' waif is properly applied to goods that are stolen, yet it may be also said of goods not stolen or taken away, as where a person is pursued with hue and cry as a felon, and he flies and leaves his own goods; in this case these shall be forfeited as stolen goods, or what are usually called fugitives goods.

Waif is also applied to things lost, and estrays, which, no owner appearing, are forfeited to the lord of the manor, after they have been cried and published in the markets.

WAIGRATS STRAITS, situated between Nova Zembla and Russia, through which the Dutch sailed to the north, as high as 75°, in order to discover a north-east passage

paſſage to China, and the Eaſt-Indies.

WAIN, in aſtronomy. See URSA.

WAINFLEET, a market-town of Lincolnſhire, thirty-five miles eaſt of Lincoln.

WAINSCOT, in building, the timber-work that ſerves to line the walls of a room, being uſually made in pannels, and painted, to ſerve inſtead of hangings. It is uſual even in halls to have wainſcot breaſt high, by reaſon of the natural moiſtneſs of the walls. Some joiners put charcoal behind the pannels, to prevent the ſweat of the ſtone and brick walls from ungluing the joints; others uſe wool for the ſame purpoſe, but the only ſure way is to prime over the back ſides of the joints with white lead, ſpaniſh brown, or linſeed-oil.

The wainſcotting with norway oak, according to Neve, the workman finding ſtuff, is valued at 6 s. or 7 s. per yard ſquare; plain ſquare wainſcotting, the workman finding deal, is valued at 3 s. and 3 s. 6 d. per yard. Ordinary biſſection wainſcotting, the workman finding deal, is worth 3 s. and 6 d. and 4 s. per yard. Large biſſection wainſcotting, with dantzic ſtuff, is valued at 6 s. or 7 s. per yard.

WAIVE, according to the different acceptation of the word, ſignifies to forſake; but in the law it is eſpecially applied to a woman, who, for any crime, for which a man may be outlawed, is termed waive.

WAIVER, in law, denotes the paſſing by of a thing, or a refuſal to accept thereof; and relates ſometimes to an eſtate conveyed to a perſon, and ſometimes to a plea. It is held, where a particular eſtate is granted with a remainder over, in that caſe, he that has it, may not regularly waive it to the damage of him in remainder; though where one has the reverſion it is otherwiſe, for that is not hurt by ſuch waiver.

WAKE *of a ſhip*, is the ſmooth water aſtern when ſhe is under ſail: this ſhews the way ſhe has gone in the ſea, whereby the mariners judge what way ſhe makes. For if the wake be right a-ſtern, they conclude ſhe makes her way forwards; but if the wake be to leeward a point or two, then they conclude ſhe falls to the leeward of her courſe. When one ſhip, giving chaſe to another, is got as far into the wind as ſhe, and ſails directly after her, they ſay, ſhe has got into her wake. A ſhip is ſaid to ſtay to the weather of her wake, when in her ſtaying, ſhe is ſo quick, that ſhe does not fall to leeward upon a tack, but that when ſhe is tacked, her wake is to the leeward; and it is a ſign ſhe feels her helm very well, and is quick of ſteerage.

WAKE, is the eve feaſt of the dedication, of churches, which is kept with feaſting and rural diverſions.

WAKEFIELD, a market-town in the weſt-riding of Yorkſhire, ſituated on the river Caulder, twenty-four miles ſouth-weſt of York.

WALACHIA, a province of Turky in Europe, bounded by the Irongate mountains, which ſeparate it from Tranſilvania, on the north-weſt; by Moldavia on the north-eaſt; by the river Danube, which ſeparates it from the province of Bulgaria, on the ſouth-eaſt; and the ſame river ſeparates it from the province of Servia on the ſouth-weſt. It is two hundred miles long, and one hundred broad.

WALCOURT, a town of the biſhopric of Liege, ſituated on the confines of Namur, eight miles ſouth of Charleroy.

WALDEC, a town of Germany, in the circle of the Upper Rhine, and landgraviate of Heſſe Caſſel, twenty miles ſouth-weſt of Heſſe Caſſel city.

WALDEN, a market-town of Eſſex, ſituated twenty-five miles north-weſt of Chelmsford.

WALE, or WALES, in a ſhip, thoſe outermoſt timbers in a ſhip's ſide, on which the ſailors ſet their feet in climbing up. They are reckoned from the water, and are called her firſt, ſecond, and third wale, or bend. See the article SHIP.

WALE-KNOT, a round knot or knob made with three ſtrands of a rope, ſo that it cannot ſlip, by which the tacks, top-ſail ſheets, and ſtoppers are made faſt, as alſo ſome other ropes.

WALE REARED, on board a ſhip, a name the ſeamen give to a ſhip, which, after ſhe comes to her bearing, is built ſtrait up: this way of building, though it does not look well; nor is, as the ſeamen term it, ſhip ſhapen; yet it has this advantage, that a ſhip is thereby more roomy within board, and becomes thereby a wholeſome ſhip at ſea, eſpecially if her bearing be well laid out.

WALES, a principality in the weſt of England, comprehending 12 counties, bounded by Cheſhire, Shropſhire, Herefordſhire, and Monmouthſhire, on the eaſt, and ſurrounded by the ſea called the Iriſh Channel, on the north, weſt, and ſouth.

*New* WALES, the ſouth-weſt coaſt of Hudſon's Bay, in North America, ſo called; now

now poffeffed by the englifh Hudfon's Bay company.

WALKER, the fame with forefter. See the article FORESTER.

WALK, in gardening. See ALLEY.

Thofe made of gravel, fand, or grafs, are the moft common in England; but where gravel or fand cannot be procured, they are fometimes laid with powdered coal, fea-coal afhes, or powdered brick. In order to the laying of gravel walks, it is very proper that the bottom of them be filled with fome lime-rubbifh, coarfe gravel, flint-ftones, or other rocky materials. This bottom fhould be laid eight or ten inches thick, over which the coat of gravel fhould be fix or eight. The common allowance for a gravel walk of five feet breadth, is an inch in the crown; fo that if a walk be twenty feet wide, according to this proportion, it will be four inches higher in the middle than on each fide; and a walk of twenty-five feet will be five inches; one of thirty feet fix inches; and fo on. In order to lay gravel walks firm, it will be neceffary to give them three or four water rollings; that is, they muft be rolled, when it rains fo very faft, that the walks fwim with water: this will caufe the gravel to bind. Iron mould gravel is the beft for binding; or gravel with a little binding loam amongft it. The beft gravel for walks is fuch as abounds with fmooth pebbles, which, being mixed with a due proportion of loam, will bind like a rock, and is never injured by wet or dry weather. The width of the walks muft always be proportioned to their length, and the fize of the garden. For farther particulars, fee the article GRAVEL.

Grafs walks in a garden are both ornamental and delightful. See GRASS.

Sand walks are alfo frequently made in gardens, as being lefs expenfive in the making and keeping, than the former; for as the greateft part of the walks made in gardens twift about in an irregular manner, it would be very difficult to keep them handfome if they were made of gravel; and as the walks are for the moft part fhaded with trees, fo the dripping of the water from their branches in hard rains, would wafh the gravel in holes, and render the walks very unfightly. When the ground is traced out in the manner the walks are defigned in, the earth fhould be taken out of the walks, and laid in the quarters. The depth of this fhould be proportioned to the nature of the foil; for where the ground is dry, the walks need not be elevated much above the quarters; fo the earth fhould be taken out four or five inches deep in fuch places; but where the ground is wet, the bottom of the walks need not be more than two inches below the furface, that the walks may be raifed fo high as to throw off the wet into the quarters. After the earth is taken out, the bottom of the walks fhould be laid with rubbifh four or five inches thick, and beaten down as clofe as poffible; then the fand fhould be laid on about three inches thick; and after treading it down, it fhould be raked over, to level and fmooth the furface. In doing of this, the whole fhould be laid a little rounding, to throw off the wet: but there will be no neceffity of obferving any exactnefs therein; for as the whole ground is to have as little appearance of art as poffible, the rounding fhould appear natural, and only fo contrived, as that the water may have free paffage off.

WALK, in the manege, is the floweft, and leaft raifed of all a horfe's goings. It is performed by the horfe's lifting up his two legs on a fide, the one after the other, beginning with the hind leg firft. Thus, if he leads with the legs of the right fide, then the firft foot he lift is the far hind-foot, and in the time he is fetting it down (which in a ftep is always fhort of the tread of his fore-foot on the fame fide) he lifts his far fore-foot, and fets it down before his near fore-foot. Again, juft as he is fetting down his far fore-foot, he lifts up his near hind-foot, and fets it down again juft fhort of his near fore-foot; and juft as he is fetting it down, he lifts his near fore-foot, and fets it down beyond his far fore-foot.

WALL, in architecture, the principal part of a building, as ferving both to inclofe it, and fupport the roof, floors, *&c.* See the article BUILDING.

Walls are diftinguifhed into various kinds, from the matter whereof they confift, as plaftered or mud-walls, brick-walls, ftone-walls, flint, or boulder walls, and boarded walls. In all which thefe general rules are to be regarded. 1. That the right angle therein depending is the true caufe of all ftability, both in artificial and natural pofition. 2. That the maffieft and heavieft materials be the loweft, as fitter to bear than to be borne. 3. That the walls, as they rife, diminifh proportionably in thicknefs, for eafe both

of weight and expence. 4. That certain courfes or ledges, of more ftrength than the reft, be interlaid, like bones, to ftrengthen the whole fabrick. See the article HOUSE, *&c.*

Brick-walls are the moft important and ufual amongft us. In thefe, particular care is to be taken about laying of the bricks; that in fummer they be laid as wet, and in winter as dry, as poffible, to make them bind the better with the mortar: that in fummer, as faft as they are laid, they be covered up, to prevent the mortar, *&c.* from drying too faft: that in winter they be covered well to protect them from rain, fnow, and froft, which are all enemies to mortar: that they be laid joint on joint in the middle of the walls as feldom as may be: but that good bond be made there as well as on the outfide. Care is to be taken that the angles be firmly bound, which are the nerves of the whole edifice. In order to which, in working up the walls of a building, it is not advifeable to raife any wall above eight feet high, before the next adjoining wall be wrought up to it, that fo good bond may be made in the progrefs of the work: it may be worth notice, that a wall a brick and a half thick, with the joint, will be in thicknefs fourteen inches, or very near; whence 150 or 160 bricks will lay a yard fquare meafured upon the face of the building; and to the fquare of ten foot are ufually allowed 1700 or 1800 bricks. Flint, or boulder walls are much ufed in fome parts of Suffex and Kent, for fence-walls, round courts, gardens, *&c.* A right and left handed man fits well for this work, as they have a hod of mortar poured down upon the work, which they part between them, each fpreading it towards himfelf, and fo they lay in the flints. The mortar for this work muft be very ftiff.

WALL, in gardening. Of all materials for building walls for fruit-trees, brick is the beft; it being not only the handfomeft, but the warmeft and kindeft for the ripening of fruit; and affording the beft conveniency for nailing, as fmaller nails will ferve in brick than will in ftone-walls, where the joints are larger; and if the walls are coped with free-ftone, and ftone pilafters or columns at proper diftances, to feparate the trees, and break off the force of the winds, they are very beautiful, and the moft profitable walls of any others. In fome parts of England there are walls built both of brick and ftone, which are found very commodious. The bricks of fome places are not of themfelves fubftantial enough for walls; and therefore fome perfons that they might have walls both fubftantial and wholefome, have built thefe double, the outfide being of ftone, and the infide of brick: but there muft be great care taken to bind the bricks well into the ftone, otherwife they are very apt to feparate one from the other, efpecially when froft comes after much wet.

There have been feveral trials made of walls built in different forms; fome of them having been built femicircular; others in angles of various fizes; and projecting more towards the north, to fcreen off the cold winds: but there has not as yet been any method which has fucceeded near fo well as that of making the walls ftrait, and building them upright. Where perfons are willing to be at the expence, in the building of their walls fubftantial, they will find it anfwer much better than thofe which are flightly built, not only in duration, but in warmth: therefore a wall two bricks thick, will be found to anfwer better than that of one brick and a half: and if in building of garden-walls they are grouted with foft mortar, to fill and clofe all the joints, the walls will be much ftronger, and the air will not fo eafily penetrate, as it does through thofe which are commonly built.

For the afpect or fituation of garden-walls, fee the article EXPOSURE.

WALLINGFORD, a borough town of Berkfhire, fituated on the river Thames, twelve miles north of Reading.

WALLOONS, the inhabitants of a confiderable part of the fpanifh Netherlands, *viz.* thofe of Artois, Hainault, Namur, Luxemburgh, and part of Flanders and Brabant.

The walloon language is faid to have been that of the antient Gauls or Celts.

WALRUS, in zoology, the englifh name of the phoca, with a canine teeth exerted. See the article PHOCA.

This is much larger than the fea-calf, or phoca, with the canine teeth covered; growing to the fize of the largeft ox; the head is very large, and almoft of a rounded figure; the eyes are large and prominent; there are no ears, but only an aperture on each fide of the head, of an oblong form, and not very large; the nofe is obtufe; the noftrils large, and the creature contracts and dilates them

at pleafure; the mouth is very large, and the upper part of it furnifhed with thick and cartilaginous whifkers; the tongue is fhort, the canine teeth of the upper jaw are of an enormous length and fize, and they hang downwards and forwards toward the breaft; the creature ufes thefe ftrange weapons to climb upon the ice, and to hang itfelf to the rocks in its getting on fhore to fleep.

WALNUT-TREE, juglans, in botany. See the article JUGLANS.

WALSALL, a market-town of Staffordfhire, thirteen miles fouth of Stafford.

WALSHAM, a market-town of Norfolk, eleven miles north of Norwich.

WALSINGHAM, a market-town of Norfolk, eighteen miles north-weft of Norwich.

WALTHAM, a market-town of Leicefterfhire, fixteen miles north-eaft of Leicefter.

WALTHERIA, in botany, a genus of the monadelphia-pentandria clafs of plants, the flower of which confifts of five petals, vertically cordated and patent: the fruit is an unilocular bivalve capfule, vertically ovated, and the feed is fingle, obtufe, and broadeft at top.

WANGEN, a market town of Germany, in the circle of Suabia, twenty-five miles eaft of Conftance.

WANLASS, in hunting. Driving the wanlafs, is the driving of deer to a ftand, that the lord may have a fhoot, which is one of the cuftomary fervices of fiefs.

WANTAGE, a market-town of Berkfhire, fifteen miles fouth of Oxford.

WAPENTAKE, (from the Saxon) the fame with what we call a hundred, and more efpecially ufed in the northern counties beyond the river Trent. There have been feveral conjectures as to the original of the word; one of which is, that antiently mufters were made of the armour and weapons of the inhabitants of every hundred; and from thofe that could not find fufficient pledges of their good abearing, their weapons were taken away, and given to others; whence it is faid this word is derived. See HUNDRED.

WAR, a conteft or difference between princes, ftates, or large bodies of people; which not being determined by the ordinary meafures of equity and juftice, is referred to the decifion of the fword.

*Holy* WAR, is that antiently maintained by leagues and croifades, for the recovery of the holy-land. See CROISADE.

*Council of* WAR. See COUNCIL.

*Man of* WAR. See SHIP, RATE, &c.

*Place of* WAR. See the article PLACE.

WARADIN *little*, a town of Upper Hungary, twenty-three miles eaft of Tockay, eaft long. 21° 20′, north lat. 48° 18′.

WARADIN *great*, a town of Upper Hungary, an hundred miles eaft of Buda: eaft long. 21° 50′, north lat. 47° 15′.

WARD, in law-books, a word of divers fignifications: thus, a ward in London, is a part of the city committed to the fpecial charge of one of the aldermen of the city. There are twenty-fix wards in London, which are as hundreds, and the parifhes thereof as towns. A foreft is alfo divided into wards, and fo are moft of our hofpitals.

WARD, WARDA, or WARDAGIUM, is alfo ufed, in our antient writings, for the cuftody of a town or caftle, which the tenants and inhabitants were bound to keep at their own charge.

WARD-HOOK, or WADD-HOOK, in gunnery, a rod of ftaff with an iron end turned ferpent-wife, or like a fcrew to draw the wadding out of a gun when it is to be unloaded. See the article WADD.

WARDA ECCLESIARUM, denotes the guardianfhip of churches; which is in the king, during vacancies, by reafon of the regalia or temporalities.

WARDEN, or GUARDIAN, one who has the charge or keeping of any perfon, or thing, by office. See GUARDIAN.

Such is the warden of the fleet, the keeper of the fleet-prifon; who has the charge of the prifoners there, efpecially fuch as are committed from the court of chancery for contempt.

Warden, in an univerfity, is the head of a college; anfwering to what in other colleges we call the mafter thereof.

Warden, or lord-warden of the cinque ports, is the governor of thefe noted havens; who has the authority of an admiral, and fends out writs in his own name.

Warden of the mint, is an officer whofe bufinefs it is to receive the gold and filver bullion brought in by the merchants, to pay them for it, and overfee the other officers. He is called keeper of the exchange and mint.

*Church* WARDENS. See CHURCH.

WARDHUYS, a port of Norwegian Lapland, 120 miles fouth-eaft of the north-cape: eaft long. 28°, and north lat. 71°.

WARDMOTE, in London, is a court fo called which is kept in every ward of the city, anfwering to the curiata comitia in antient Rome. See COURT.

WARD-

WARDROBE, a closet, or little room adjoining to a bed-chamber, serving to dispose and keep a person's apparel in; or, for a servant to lodge in, to be at hand to wait, *&c.*

Wardrobe, in a prince's court, is an apartment wherein his robes, wearing apparel, and other necessaries are preserved under the care and direction of proper officers; as the master of the wardrobe, clerk, *&c.* of the wardrobe. See the article MASTER and CLERK.

WARE, a market-town of Hertfordshire, under the meridian of London, and twenty miles north of that city.

WAREHAM, a borough of Dorsetshire, seventeen miles east of Dorchester.

WARMINSTER, a market-town of Wiltshire, seventeen miles north-west of Salisbury.

WARN, in law, is to summon a person to appear in a court of justice. See the article SUMMONS.

WARNEMUNDE, a town of Lower Saxony, twenty-six miles north east of Wismar: east long 12° 15′, and north lat. 54° 30′.

WARNETON, a town of Flanders, seven miles north-west of Lisle.

WARNING-PIECE, in the military art, is the gun which is fired every night about sun-set, to give notice to the drums and trumpets of the army to beat and sound a retreat or tattou, which is likewise called, setting the watch. See the article RETREAT.

WARNING-WHEEL, in a clock, is the third or fourth, according to its distance from the first wheel. See the article CLOCK.

WARP, in the manufactures, is the threads, whether of silk, wool, linen, hemp, *&c.* that are extended lengthwise on the weaver's loom; and a-cross which the workman by means of his shuttle passes the threads of the woof, to form a cloth, ribband, fustian, or other matter.

For a woollen stuff to have the necessary qualities, it is required that the threads of the warp be of the same kind of wool, and of the same fineness throughout; that they be sized with flanders or parchment-size, well prepared, and that they be in sufficient number with regard to the breadth of the stuff to be wrought.

To warp a ship, is to shift her from one place to another, when the wind and tide will permit it without danger.

WARRANT, an act, instrument, or obligation, whereby a person authorises another to do something which he otherwise had not a right to do.

Warrant of attorney, is that whereby a man appoints another to do something in his name, and warrants his action. It seems to differ from a letter of attorney, which passes under hand and seal of him who makes it, before creditable witnesses; whereas warrant of attorney, in personal, mixed, and some real actions, is put in of course by the attornies for the plaintiffs or defendants.

WARRANTY, *warrantia*, a promise or covenant by deed, made by the bargainer for himself and his heirs, to warrant and secure the bargainee and his heirs against all men for enjoying the thing agreed on between them.

WARRANTIA CHARTÆ, a writ that lies for a person who is infeoffed in lands and tenements, with clause of warranty, and is impleaded in an assize, or writ of entry, wherein he cannot vouch or call to warranty. See the article VOUCHER.

WARRANTIA DIEI, a writ which lies in case where a man, having a day assigned personally to appear in court to an action, wherein he is sued, is, in the mean time, by commandment employed in the king's service; so that he cannot come at the day assigned. It is directed to the justices, ordering them not to find or record him in default.

WARREN, *warrena*, a franchise, or place privileged either by prescription or grant from the king, to keep beasts and fowl of warren in; as rabbits, hares, partridges, pheasants, *&c.*

By statute 21 Edward III. a warren may lie open, and there is no need of closing it in, as there is a park.

In the setting up a warren, great caution is to be used for the fixing upon a proper place, and a right situation. It should always be upon a small ascent, and exposed to the east or the south. The soil that is most suitable, is that which is sandy; for when the soil is clayey or tough, the rabbits find greater difficulty in making their burrows, and never do it so well; and if the soil be boggy or moorish, there would be very little advantage from the warren, for wet is very destructive of these animals.

All due precautions must be taken, that the warren be so contrived, that the rabbits may habituate themselves to it with ease. Many would have it that warrens should be enclosed with walls;

 but

but this is a very expenfive method, and feems not neceffary nor advifeable; for we find but very few that are fo, and thofe do not fucceed at all the better for it.

WARRINGTON, a market-town of Lancafhire, feventeen miles eaft of Liverpool.

WARSAW, the capital of Warfovia, and of the kingdom of Poland: eaft long. 21° 5′, and north lat. 52° 15′.

WARSOVIA, or MASSOVIA, a province of Poland, bounded by Pruffia, on the north; by Polachia, on the eaft; by the province of Little Poland on the fouth; and by that of Great Poland on the weft.

WART, *verruca*, in furgery, a little round hard excrefcence arifing from the flefh like a pea.

A wart begins at the cutis, and feems to be either an efflorefcence of the ferum of the blood, which hardening in the furface of the fkin makes a dry tumor; or elfe fome fmall luxuriancy of the little arteries of the cutis, which thruft themfelves out, making a petty farcoma, which we call a foft wart. See SARCOMA.

According to the variety of the tumour, it is fometimes whole with a fmooth furface, fometimes chapped and uneven.

The method of cure which deferves to be firft mentioned, is by ligature or vincture; this is performed upon fuch of thefe excrefcences as are flender about the roots, and in a manner pendent, by firmly tying about them an horfe-hair, or a filken or linen-thread. The waters, being deprived of the juices which nourifh them through a conftriction of the veffels by the ligature, gradually wither and fall away.

Another method of cure, is the furgeon's inftrument, in which the wart is taken up by an hook or forceps, and then very nicely feparated by the fciffars. The wound is treated for fome time with an application of the lapis infernalis, or fome other corroding medicine, that, if any part of a root fhould remain, from which a new tubercle might arife, it might be confumed and deftroyed. See the article WOUND.

The cure by cauftics is beft performed by cutting off the hard upper part of the wart, with a razor or fciffars, and then furrounding its bottom with a circle of wax to prevent the fpreading of the remedies; to touch it daily with oil of tartar, fpirit of falt, aqua-fortis, or butter of antimony. See the article CAUSTIC.

The cure by cautery is performed by choofing a cautery of a proper fize, and with that burning down to the root of the wart. This is the moft painful of all the methods of extirpating thefe excrefcences; but the pain is but for a moment, and the warts extirpated this way never return again.

The cure by evulfion is performed by anointing them with foftening ointment, and then feizing them artfully between the thumb and fore-finger, and forcibly wrenching them out. This is a mountebank method, and a bad one; for it is not only very painful, but the warts commonly grow up again.

When warts are found to look livid and blue, it is beft to let them alone entirely; becaufe when irritated, they frequently degenerate into a cancer. See the article CANCER.

WARTA, a town of Great Poland, fituated on a river of the fame name, fifty-feven miles fouth-eaft of Pofna.

WARTENBURG, a town of Silefia, twenty miles north-eaft of Breflaw.

WARWICK, the capital of Warwickfhire, fituated on the river Avon, eighty miles north-weft of London: weft long. 1° 32′, north lat. 52° 20′.

WARWICK, is alfo a town of Flanders, eight miles fouth-eaft of Ypres.

WASEIGNE, a town of the Auftrian Netherlands, nine miles north of Namur.

WASH, among diftillers, the fermentable liquor ufed by the malt-diftillers. See the article DISTILLERY.

It fhould be about the ftrength of the ten fhilling fmall-beer; and if the fpirit be expected fine, it had better be too thin than too thick. It is only made by mixing the water hot with the malt ground into meal. If the water be too hot, the mixture will become gluey; and if too cool, a part of the virtue of the malt will be loft. Under the right application of the water is to be confidered the proper manner of agitating the mafs, fo that all the parts of the aqueous fluid may come fully and freely in contact with the foluble particles of the fubject. When once the water is well faturated by ftanding on the malt a proper time, it muft be drawn off, and frefh poured on, till at length the whole virtue, or all the fugary fweetnefs of the malt is extracted, and nothing but a fixed hufky matter remains behind, incapable of being farther diffolved by the action of hot or boiling water; or of being advantageoufly wafhed

ed or rinfed out by the bare affufion of cold. This artificial and external agitation or ftirring about of the mafs, is neceffary not only in the common way of brewing for the malt-diftillery, but alfo in that more expeditious way, now in ufe with fome, of reducing the operations of brewing and fermenting to one, and grinding the malt to a fine meal, which is to be kept in the wafh during the whole time, and even put into the ftill with it, and worked together. The ftirring may be repeated to great advantage more than once in each operation, as at the affufion of every parcel of frefh water, in the common way, and at any fhortly diftant times in the fhort way, in which it is of greater fervice.

The action of fermentation works fuch a change in the body of the tincture or folution, called the wafh, as to render it feparable by diftillation, into parcels of matter that are fpecifically different, and of a nature entirely foreign to what the fame liquor would have yielded without the fermentation. See the article DISTILLATION.

WASHING, in painting, in when a defign, drawn with a pen or crayon, has fome one colour laid over it with a pencil, as Indian-ink, biftre, or the like, to make it appear the more natural, by adding the fhadow of prominences, apertures, &c. and by imitating the particular matters, whereof the thing is fuppofed to confift.

Thus they wafh with a pale red to imitate brick and tile; with a pale indian-blue, to imitate water and flate; with green, for trees and meadows; with faffron or french-berries, for gold or brafs; and with feveral colours for marbles. Thefe wafhes are ufually given in equal teints or degrees throughout; which are afterwards brought down and foftened over the lights with fair water, and ftrengthened with deeper colours for the fhadows.

Some colours are of fuch a gritty, fandy nature, that it is impoffible to grind them fo fine as fome curious works require; therefore, in order to get forth the flour and finenefs of the colour, it muft be wafhed, which is done thus: Take what quantity of colour you pleafe to wafh, and put it into a veffel of fair water; ftir it about till the water be all coloured therewith, and if any filth fwim on the top of the water, fcum it clean off; and, when you think the groffeft of the colour is fettled at the bottom, then pour off that water into another earthen veffel, that is large enough to contain the firft veffel full of water four or five times; then pour more water into the firft veffel, and ftir the colour that remains till the water be thick; and, after it is a little fettled, pour the water alfo into the fecond veffel, and fill the firft veffel again with water, ftirring it as before; continue to do this till you find all the fineft of the colour drawn forth, and none but coarfe gritty ftuff remain in the bottom; then let this water in the fecond veffel ftand to fettle till it is perfectly clear, and that all the colour be funk to the bottom; which when you perceive, then pour the water clear from it, and referve the colour in the bottom for ufe, which muft be perfectly dried before you mix it with oil to work.

The colours thus ordered, are red lead, blue and green bice, verditer, blue, green fmalt, and fpanifh brown, when you would cleanfe it well from ftones for fome fine work, as alfo yellow oker, when you intend to make gold fize of it.

WASHING *of ores*, the purifying an ore of any metal, by means of water, from earths and ftones, which would otherwife render it difficult of fufion; this operation Cramer orders to be done as follows: Break the ore to a coarfe powder in an iron mortar, weigh twenty or thirty docimaftical centners of it, put them into the wafhing-trough, and pour fome water upon them, that the ore may be thoroughly moift; then have a veffel full of water, the diameter of which muft be a little larger than the length of the trough; take the trough with the left-hand, by the top of the hinder part, and dipping it horizontally into the water, move it gently with the right-hand from the fore-part of the trough, which is always to be made the fhallower part of it, toward the hinder part, which is deeper; then take out the trough, and incline it a little on the fore-part, that the water may run out, and the heavier metallic part remain at the bottom; repeat this feveral times till the remains at the bottom of the trough are quite pure. If the ftone in which the ore is lodged be too hard for powdering in its natural ftate, as the flinty and debafed cryftalline ones commonly are, the whole muft be calcined, and quenched in cold water feveral times over, and

and afterwards powdered and washed in this manner: when it is thus washed, assay a centner of it, and from the bead of metal this yields, it will be easy to estimate the value of the ore.

WASHING, or WASHES, among goldsmiths, coiners, &c. are the lotions whereby they recover the particles of gold and silver out of the sweep, *i. e.* ashes, earths, sweepings, &c.

This is either performed by simply washing them again and again, or by putting them in the washing-mill.

To make one of these washes, they not only gather together the ashes of the furnaces, and sweepings of the work-houses, but they also break and pound the old earthen crucibles and the very bricks whereof the furnaces are built; little particles of gold, &c. being found to stick to them by the crackling natural to those metals, when in their last degree of heat.

These matters, being ground and mixed together, are put in large wooden basons, where they are washed in several waters, which run off by inclination into troughs underneath; carrying with them the earth, and the insensible particles of the metals, and only leaving behind them the larger and more considerable ones which are visible to the eye, and taken out by the hand without more trouble.

To get out the finer parts gone off with the earth, they use quicksilver and a washing-mill. This mill consists of a large wooden trough, at the bottom of which are two metalline parts, serving as mill-stones; the lower being convex, and the upper, which is in form of a cross, concave.

A-top is a winch placed horizontally, which turns the upper piece round; and at bottom, a bung to let out the water and earth, when sufficiently ground.

To have a *wash*, then, the trough is filled with common water, into which they cast thirty or forty pounds of quicksilver, and two or three gallons of the matter remaining from the first lotion. Then turning the winch, they give motion to the upper mill-stone, which grinding the matter and the quick-silver violently together, the particles of gold and silver become the more easily amalgamated therewith. This work they continue for two hours, when, opening the bung, the water and earths run out, and a fresh quantity is put in.

The earths are easily passed thus through the mill three times, and the same quantity of mercury usually serves all the three times. When there is nothing left in the mill but the mercury united with the gold or silver which it has amalgamated, they take it out, and washing it in divers waters, they put it in a ticken-bag, and lay it in a press to squeeze out the water, and the loose quicksilver; the remaining quicksilver they evaporate by fire, in a retort, or an alembic. The metal which remains they refine with lead, or part it with aqua fortis. See ASSAYING.

WASP, in zoology, the black apis, with four yellow circles on the body. See the article APIS.

WASP-FLY, the vespæform asilus, with the antennæ longer than the head. See the article ASILUS.

WAST, or WASTE, *vastum*, in law, has divers significations. It is used for a spoil, made either in houses, woods, lands, &c. by the tenants for life, or for years, to the prejudice of the heir, or of him in reversion or remainder.

Upon this the writ of waste is brought for the recovery of the thing wasted, and treble damages.

WASTE *of the forest*, is properly where a man cuts down his own woods within the forest, without licence of the king or lord chief justice in eyre.

WASTE is also taken for those lands which are not in any man's occupation, but lie common.

They seem to be so called, because the lord cannot make such profit of them, as of his other lands, by reason of the use others have thereof, for passing to and fro. Upon this none may build, cut down trees, dig, &c. without the lord's licence.

WASTE *of a ship*, is that part of her between the main and foremast.

WASTE-BOARDS, are boards sometimes set upon the side of a boat, or other vessel, to keep the sea from breaking into her.

WASTE-CLOTHS, in a ship of war, the same with fights. See the article FIGHT.

WATCH, in the art of war, a number of men posted at any passage, or a company of the guards who go on the patrol. See the articles GUARD and PATROL.

Also a person posted as a spy in any place, to have an eye thereto, and to give notice of what passes. A watch is properly intended for the apprehending of rogues in the night, as ward is for the like purpose in the day time; and for default to watch and ward, the township, &c. is punishable.

punishable. It is ordained, that in all towns between Michaelmas day and the day of Ascension, there shall be night-watches kept in each city, with six men at every gate, and six or four in a town. Also every borough is to have twelve men to watch therein, or otherwise in proportion to the number of the inhabitants in the place, from sun-set to sun-rising, who are to arrest strangers suspected, and disturbers of the peace, &c. and may justify the detaining of them till the morning; or they may deliver them to the constable, in order to be carried before a justice.

At sea, the term watch denotes a measure or space of four hours, because half the ship's company watch, and do duty in their turns, so long at a time; and they are termed star-board watch, and larboard-watch.

WATCH is also used for a small portable movement or machine for the measuring of time; having its motion regulated by a spiral spring. See the article SPRING.

Watches, strictly taken, are all such movements as shew the parts of time; as clocks are such as publish it, by striking on a bell, &c. But, commonly, the name watch is appropriated to such as are carried in the pocket, and clock to the large movements, whether they strike or not. See the article CLOCK.

The several members of the watch part are, 1. The ballance, consisting of the rim, which is its circular part; and the verge, which is its spindle, to which belong the two pallats or levers that play in the teeth of the crown-wheel. 2. The potence, or pottance, which is the strong stud in pocket-watches, whereon the lower pivot of the verge plays, and in the middle of which one pivot of the ballance-wheel plays; the bottom of the potence is called the foot, the middle part the nose, and the upper part the shoulder. 3. The cock, which is the piece covering the ballance. 4. The regulator or pendulum spring, which is the small spring in new pocket-watches, underneath the ballance. 5. The pendulum, whose parts are the verge, pallets, cocks, and the bob. 6. The wheels, which are the crown-wheel in pocket-pieces, and swing-wheel in pendulums, serving to drive the ballance or pendulum. 7. The contrate-wheel, which is that next the crown-wheel, &c. and whose teeth and hoop lie contrary to those of other wheels; whence the name. 8. The great or first wheel, which is that the fusee, &c. immediately drives: after which are the second wheel, third wheel, &c. 9. Lastly, between the frame and dial-plate, is the pinion of report, which is that fixed on the arbor of the great wheel, and serves to drive the dial-wheel, as that serves to carry the hand. See the article BALLANCE, &c.

For the theory and calculation of watch-work, see the article CLOCK.

*Spring* or *pendulum* WATCHES, are pretty much upon the same principle with pendulum clocks, whence their denomination. If a pendulum describing little arches of a circle make vibrations of unequal lengths, in equal times, it is by reason it describes the greater with a greater velocity. For the same reason a spring put in motion, and making greater or less vibrations, as it is more or less stiff, and as it has a greater or less degree of motion given it, performs them nearly in equal times. Hence, as the vibrations of the pendulum had been applied to large clocks to rectify the inequality of their motions; so to correct the unequal motions of the ballance of watches, a spring is added, by the isochronism of whose vibrations the correction is to be effected.

The spring is usually wound into a spiral, that, in the little compass allotted it, it may be as long as possible, and may have strength enough not to be mastered and dragged about by the inequalities of the ballance it is to regulate. The vibrations of the two parts, *viz.* the spring and ballance, should be of some length; only so adjusted, as that the spring, being more regular in the length of its vibrations than the balance, may on occasion communicate its regularity thereto.

The invention of spring or pocket watches, is owing to the artists of the present age. It is true, we find mention made of a watch presented to Charles V. in the history of that prince; but this in all probability was no more than a kind of clock to be set on a table, some resemblance whereof we have still remaining in the antient pieces made before the year 1670.

In effect, it is between Dr. Hooke and Mr. Huygens, that the glory of this excellent invention lies, but to which of them it properly belongs, is greatly disputed; the English ascribed it to the former, and the French, Dutch, &c. to the latter. Mr. Derham, in his artificial clock-maker, says plainly that Dr. Hooke was

was the inventor; and adds, that he contrived various ways of regulation. One way was with a load-ftone. Another with a tender ftraight fpring, one end whereof played backwards and forwards, with the ballance; fo that the ballance was to the fpring, as the bob to a pendulum; and the fpring, as the rod thereof. A third method was with two ballances, of which there were divers forts; fome having a fpiral fpring to the ballance for a regulator, and others without. But the way that prevailed and continues in mode, was with one ballance and one fpring running round the upper part of the verge thereof. Though this has a difadvantage which thofe of two fprings, *&c.* were free from, in that a fudden jerk or confufed fhake will alter its vibrations, and put it in an unufual hurry. The time of thefe inventions was about the year 1658, as appears, among other evidences, from an infcription on one of the double-ballance watches prefented to king Charles II. *viz.* Robert Hooke invent. 1658. T. Tompion fecit, 16. The invention prefently got into reputation, both at home and abroad; and two of them were fent for by the dauphin of France.

Soon after this, Mr. Huygens's watch, with a fpiral fpring, got abroad, and made as great noife in England, as if the longitude could be found by it. It is certain, however, that his invention was later than the year 1673, when his book de Horol. Ofcillat. was publifhed, wherein he has not one word of this, though he has of feveral other contrivances in the fame way.

*Aftronomical* WATCH, a machine invented by Mr. Neale, for folving feveral aftronomical problems. It has two glaffes; that in the front covers a dial-plate, as in common watches; the other on the backfide, covers a plate forming a fegment of a globe, on which are drawn twenty-four meridian lines, with the names of fo many countries, at 15° difference of longitude from each other. (See plate CCXCVII. fig. 1.) This plate makes an entire revolution in twenty-four hours; and, confequently, every country thereon paffes by the fun, reprefented by A. Round this plate is a circle divided into 24 hours, alfo at reft; by means of which, when the moveable plate is made to correfpond to the true time, fhewn by the hands on the common fide, the time of day or night, at the feveral countries fpecified, is fhewn by the hour-circle. Round the moveable plate, and between it and the circle of hours above defcribed, moves a narrow circle, on which is engraved the moon's age; and over 29½ is placed an ivory-ball, B, reprefenting the moon: and at right angles each way, are placed two pins, C, and D, one eaftward, and the other weftward; by means of which, the time of the moon's rifing, fouthing and fetting, at thofe different places, is fhewn in a very entertaining manner. Several other ufeful aftronomical problems may alfo be folved thereby.

*Striking* WATCH, one which, befides the common watch-work for meafuring time, has a clock-part for ftriking the hours; fo that, properly fpeaking, they are pocket-clocks. See the article CLOCK.

*Repeating* WATCH, one that by only pulling a ftring, pufhing in a pin, *&c.* repeats the hour, quarter, or minute, at any time of the day or night.

WATCHING, or WAKEFULNESS, *infomnia*, in medicine, is produced by too great a determination of the nervous fluid, to the organs of the fenfes; whereby thefe organs are prepared to receive, readily, any impreffions from external objects, which they propagate to the brain, and furnifh the foul with divers occafions of thinking. This extraordinary flux of fpirits may have two caufes: for, 1. The fenfible objects may ftrike the organ with too much force. In which cafe, the animal fpirits being violently agitated, and thofe agitations continued by the nerves to the brain, they give a like motion to the brain itfelf; the neceffary confequence of which is, that the animal muft wake. Thus, a loud fhriek, pains, headach, gripes, coughing, *&c.* caufe waking. And the foul's being oppreffed with cares, or deeply engaged in thinking, contributes to the fame, fince, as it acts by the miniftry of the fpirits, any cares or meditations that keep them in motion, muft produce watchfulnefs. Of this kind are thefe inveterate wakings of melancholic perfons, fome of whom have been known to pafs three or four weeks without a wink of fleep. See the article SLEEP.

2. The other caufe is in the fpirits themfelves, which have fome extraordinary difpofition to receive motion, or to perfift in it; as from their too great heat, or that of the brain, in fevers, *&c.*

 Hence

Hence it is, that the diforder is moft frequent in fummer, in the heat of youth, *&c.* See the article HEAT.

Long fafting has the fame effect; the want of food fubtilizing the fpirits, and drying the brain. The fame is likewife an ordinary fymptom in old age, by reafon the pores of the brain and nerves having been much widened by the continual paffage of fpirits for a great number of years, the fpirits now pafs and repafs through them with too much eafe, and need not any extraordinary motion to keep the mind awake.

There are inftances of waking forty-five nights fucceffively; and we even read of a melancholy perfon, who never flept once in fourteen months. Such watchings ufually degenerate into madnefs.

When the caufe is known, it muft be removed, if poffible, and the irritated fpirits muft be appeafed with emulfions, efpecially of poppy-feeds, or with the thebaic tincture, or theriaca, and other opiates in general, not neglecting the original difeafes. In fevers, a moift foftening diet is beneficial; as alfo preparations of barley, emulfions of poppy-feeds and almonds, decoctions of fcorzonera-roots, almond-cream, and winter-flummery ufed as aliment: likewife tea made of cowflip-flowers, and gentle laxatives. When the patient is reftlefs and wakeful the night before a crifis, no hypnotics fhould be given. See the article FEVER.

When there is no other difeafe, the patient fhould fhun all care and intenfe thinking, efpecially in the evening: he fhould alfo ufe exercife, and eat light fuppers. If it is caufed by pains, they fhould be appeafed by antifpafmodics, things which temperate, and diaphoretics; and if thefe will not do, mild opiates muft be added. In old perfons, all care and folitude muft be banifhed; the mind fhould be quiet, and the moderate ufe of generous wine may be allowed in the evening; likewife medicines of amber and mufk will be proper, and confectio alkermes or theriaca with wine. The drinking of hot water, and principally coffee, muft be forbid after dinner.

WATER, *aqua*, in phyfiology, a fimple, fluid, and liquid body, reputed the third of the four vulgar elements. Sir Ifaac Newton defines water to be a fluid falt, volatile and void of tafte; but this definition Boerhaave fets afide, in as much as water is a menftruum or diffolvent of falts and faline bodies, which does not agree with the notion of its being a falt itfelf; for we do not know of any falt that diffolves another. This laft mentioned philofopher, therefore, defines water, a very fluid, fcentlefs, taftelefs, tranfparent, colourlefs liquor, which turns to ice with a certain degree of cold. See the article FLUID.

Though water be defined a fluid, it is a point controverted among philofophers whether fluidity be its natural ftate, or the effect of violence. We fometimes find it appear in a fluid, and fometimes in a folid form; and as the former, in our warmer climate, is the more ufual, we conclude it the proper one, and afcribe the other to the extraneous action of cold. Boerhaave, however, afferts the contrary, and maintains water to be naturally of the cryftalline kind; fince wherever a certain degree of fire is wanting to keep it in fufion, it readily grows into a hard glebe under the denomination of ice. Mr. Boyle is of the fame opinion. Ice, he obferves, is ufually faid to be water brought into a preternatural ftate by cold; but with regard to the nature of things, and fetting afide our arbitrary ideas, it might as juftly be faid that water is ice preternaturally thawed by heat. If it be urged, that ice left to itfelf will, upon the removal of the freezing agents, return to water; it may be anfwered, that, not to mention the fnow and ice which lie all fummer on the Alps, and other high mountains, even in the torrid zone, we have been affured, that in fome parts of Siberia, the furface of the ground continues more months in the year frozen by the natural temperature of the climate, than thawed by the heat of the fun; and a little below the furface of the ground, the water which chances to be lodged in the cavities there, continues in a ftate of ice all the year round; fo that when, in the heat of the fummer, the fields are covered with corn, if you dig a foot or two deep, you fhall find ice and a frozen foil. See the articles ICE, FREEZING, *&c.*

Water is generally divided into falt and frefh, with regard to the ocean and rivers. But, according to Dr. Shaw, it feems divifible into as many different fpecies, as the earth is into beds. Thus there are mineral waters of various kinds, according to the mineral fubftance they run over, and become impregnated with; tho' this impregnation fometimes happens in the way of vapour and exhalation.

 Water,

Water, therefore, in the general, may be as mixed a body as earth, and perhaps neither of them naturally exifts in any confiderable purity. See SEA-WATER, MINERAL-WATER, EARTH, VAPOUR, EXHALATION, &c.

In a general analyfis of water, the doctor found, 1. That common warm-water throws up numerous little bubbles, and explodes, in the exhaufted receiver of the air-pump; for which reafon water contains what may, by way of diftinction, be called æther or fpirit. 2. It contains a merely aqueous part, diftinct from æther and the fediment, as appears from diftilled common water. 3. It contains a dry folid matter, which is either earthy or faline, as appears upon a full evaporation, and from the infides of tea kettles, which, after long ufe, are lined with a ftony matter that beats off in flakes or crufty pieces. See the articles AIR, DISTILLATION, &c.

Water is not only contained in the earth as in a refervoir, but likewife floats in the atmofphere. In both cafes it is actuated, rarified, and put in motion by heat, fo as to prove inftrumental in producing effects. Thus it produces clouds, rains, dews, fprings and rivers. It refrefhes the earth, recruits vegetables, and is the fupport of fifh and other animals by conveying nutriment to all their parts. It is alfo the firft and immediate inftrument of fermentation, putrefaction, corruption, and change in all vegetable and animal fubjects. See ATMOSPHERE, CLOUD, RAIN, DEW, &c.

But the nature and ufes of water, will beft appear from the following experiments. 1. That water is contained in many folid bodies, and to appearance in dry bodies, was proved thus: a piece of the hardeft and drieft bone being procured, and diftilled in an earthen retort, with degrees of fire, a very large proportion of water, along with much oil and volatile falt, was obtained: whence it appears, that animal matters are refolvable into the four chemical principles, water, oil, falt and earth. This experiment holds true even of the oldeft hartfhorn, the drieft and hardeft woods, earths and pulverized ftones. Whence it alfo appears, that water may be concealed in folid bodies, and make a conftituent part thereof: for it is not meant that water infinuates itfelf into the fuperficial pores of bodies, fuch as wood, fkins, &c. fo as to fwell them in moift weather, and leave them fhrunk in dry; but that it remains permanently intermixed as an effential ingredient, or as a part of folid bodies. See the article BODY.

2. That water may be collected from the drieft air, or in the hotteft climate, was proved by the following experiment. Half a pint of common water was put into a cylindrical glafs wiped perfectly dry on the outfide; then was added to the water two ounces and three quarters of pulverized and dry fal ammoniac; thefe were ftirred brifkly together, whereupon the water floating in the external air was, by the coldnefs thus produced, condenfed on the outfide of the glafs as the falt diffolved within, and trickled down in fmall veins, into the fhallow bafon fet underneath to receive it. This experiment holds in all climates and places of different heights where it has been tried; whence by the law of induction we may make it univerfal, till any contradictory inftance appears. Thus, therefore, it may hold in the moft parched countries, and hotteft feafons, fo as to afford an agreeable method of cooling potable liquors, and rendering them more refrefhing. For if the containing glafs of the falt and water be fet in any liquor, the liquor will be cooled thereby; and if any confiderable improvement could be made in the contrivance, it is obferved, that it might in fome meafure ferve to fupply the thirfty traveller in parched defarts, and the failors with frefh water at fea. See SEA-WATER.

3. To determine the proportion of water contained in an affigned portion of the atmofphere, we are directed by the following experiment. Having by means of the air pump, and an exact pair of fcales, found the weight of a certain quantity of air contained in a large glafs-veffel, there was included therein a certain known weight of well dried potential cautery, whofe property it is powerfully to attract the moifture of the air. This veffel was kept clofe ftopt for feveral hours; during which time, the potential cautery was grown wet, in which ftate being weighed again, it was found confiderably to increafe; which muft be either owing to the water attracted out of the air in the glafs, or to a condenfation of the air itfelf into an aqueous fluid; for fuch a fluid might now by diftillation be obtained from the matter thus run per deliquium. It is obferved that there is room to fufpect, that if this experiment

periment were made in perfection, a weight of water almoft equal to that of the air included in the veffel, might be thus obtained, which might prove a very extraordinary difcovery, and fhew what fome have endeavoured to prove, that the matter of common air, is little more than water. See AIR and ATMOSPHERE.

4. That an earthy fubftance is naturally contained in water, was proved as follows. Three feveral glaffes were filled with pure rain-water, fpring water, and Thames water, and fuffered to ftand, clofe covered, for fome days before they were exhibited. There was an earthy fediment then depofited in all the three, but moft in the Thames water, the fediment whereof was not only larger, but alfo more foul and muddy than in the rain water; though here, alfo, it was dirty, perhaps, becaufe not carefully collected; whereas, in the pump-water, it was white, fcaly, flaky, and fhining, like fine fpangles of talc. This experiment is alfo univerfal, fo far as it has been tried with care, and holds true of the waters of all fpecies and all countries, particularly in thofe called mineral waters, from which an earthy fubftance may ufually be precipitated by art, in a confiderable proportion. See the article PYRMONT-WATER.

Certain experiments carefully made, and repeated, fhew that the terreftrial matter naturally contained in water, has a principal fhare in the growth and increafe of vegetables; all the plants that thrive in water appearing to enlarge their bulk in proportion to the earthy matter they draw from the water. Whence pure elementary water, feems but a kind of vehicle to convey this nutrimental or fubftantial part, and depofite it in the veffels through which the water moves, in order to its general exit at the furface of vegetables. But we are not here to exclude the inftrumental efficacy of the two other elements, fire and air. And this appearing to be the general office of water in the whole animal and vegetable kingdoms, *viz.* the conveyance or diftribution of the alimentary matter to all their parts, it may be proper to confider its phyfical properties, which would wonderfully fit it for this office. See the article VEGETATION.

The figure of its component parts appears to be fmooth and fpherical, like thofe of quickfilver; whence it becomes extremely moving and penetrating. Thus it readily enters the pores of wood, leather, fkins, chords, mufical ftrings, *&c.* thus likewife it becomes capable of moving and agitating particles of matter lefs active than itfelf, and fo proves the more immediate phyfical agent of fermentation, putrefaction, folution, *&c.* and thus it alfo conveys earthy and faline matters through our filtres of paper, ftone, *&c.* and even raifes fome proportion of them in diftillations. Its particles likewife appear to be extremely minute, and fo have a large fhare of furface. Hence water is admirably fitted for a folvent, or for readily entering the pores of falts, and coming into full contact with all their particles; and thus it will pafs where air cannot, on account of its moifture, or lubricating power, whereby it faftens mucilaginous matters, and will therefore foak through the clofe pores of a bladder.

The fpecific gravity of water, and confequently its goodnefs by its lightnefs, are to be directly judged of by the hydroftatical ballance. This experiment is a good fubftitute for feveral other ways of examining the purity and goodnefs of waters, both common and mineral; for it appears by numerous inftances, that light waters are, *cæteris paribus,* the beft, pureft, and wholefomeft. That water is accounted beft and wholfomeft which is not only the lighteft and freeft from earthy fediment, but that which is the moft fpiritous; and thefe properties are ufually found in pure rain-water; that being naturally diftilled from the ocean and rivers, or by the heat of the fun raifed up into the atmofphere, from whence it is returned much after the manner of common diftillation. See the articles *Specific* GRAVITY, HYDROSTATICAL *Ballance*, CHALYBEATE *Water*, &c.

From the preceding, and other experiments of Dr. Shaw, made upon water, he deduces the following axioms and canons. Firft we have feen, That water is naturally contained in fome of the drieft and hardeft bodies, and in the drieft air. 2. That itfelf naturally contains an earthy fubftance. 3. That it is the proper menftruum of falts, diffolving more of one, and lefs of another. 4. That one good fign of its purity and wholefomenefs is levity. 5. That the ingredients of a mineral water may be difcovered by chemical expedients: and, 6. That mineral-waters are imitable by art from fuch difcovery. See MINERAL WATER,

WATER, PYRMONT-WATER, &c.

Secondly, That water is of infinite ufe in all the works both of nature and art, as without it there could be no generation, nutrition, or accretion performed in any of the animal, vegetable, mineral, marine, or atmofpherical regions. The blood could not flow in the veins, the fap in the veffels of vegetables, nor the particles of minerals concrete and grow together, without water. It is this that makes the largeft part of our blood, our drink, and other aliments. There could be no corruption, fermentation, or diffolution carried on without it, no brewing, no diftilling, no wines, no vinegar, no fpirits, made without it. See the articles GENERATION, NUTRITION, ACCRETION, &c.

Thirdly, That we meet with water under an infinite variety of forms, and in an infinite variety of bodies, as that of air, vapour, clouds, fnow, hail, ice, fap, wines, blood, flefh, bone, horn, ftone, &c. through all which it feems to pafs unaltered, as an agent or inftrument that fuffers no alteration by re-action, but remains capable of refuming the form of water again upon occafion. See the articles SNOW, HAIL, &c.

Fourthly, That water in its own common ftate appears to be a combination of all the elements together, as containing a quantity of fire, which keeps it fluid, a quantity of air, and a quantity of earth; whence it can be no wonder that water alone, as it appears to the fenfes, fhould fuffice for vegetation in fome cafes, where little earth is wanted, or for fupporting animal and mineral life, where no great degree of nutriment is required; and hence it proves a gluten, or cement to fome bodies, and a folvent to others; thus it confolidates brick, plaifter of Paris, ftone, bone, &c. but diffolves falts, and fubtile earths approaching to falts, and becomes the inftrumental caufe of their action. See ELEMENT, &c.

Fifthly, That water conveys nourifhment, or a more fixed and folid matter to the parts of vegetables, where having depofited it, the finer fluid perfpires into the atmofphere, which gives us the phyfical caufe of the dampnefs and unwholefomenefs of woody countries, as they remarkably find in America. For all large vegetables act after the manner of forcing pumps, and continually draw in large quantities of water at their roots, and difcharge it at their leaves, which intimates a method of collecting water in dry countries, and likewife of making falt-water frefh. See the article VEGETATION, SEA-WATER, &c.

Sixthly, That the water in paffing thro' plants, after having depofited its more terreftrial part, does not always go off pure, but impregnated with the finer effluvia, or more fubtile particles of the vegetable; thus making an atmofphere round every plant, according to its nature odoriferous or otherwife, which fupplies us with a rule for procuring the odoriferous waters of vegetables by diftillation.

Seventhly, That the particles, not fine enough to go off thus along with the water, are left behind upon the furface of the leaves and flowers of plants, being now thickened or ftrained from their moifter parts, and remaining in the form of honey, manna, gums, balfams, &c, according to the nature of the vegetable. And hence appears the phyfical caufe of plants proving more odoriferous and fweet when the weather is both warm and moift, as immediately after a fummer's fhower. See the articles HONEY, MANNA, GUM, &c.

Eightly, That the chemical operator fhould form to himfelf an hygrometer for the fervice of his laboratory to determine the proportion of water at all times contained in the air, which continually mixes with his preparations, differently augments their weight, and promotes or hinders many of his operations. See LABORATORY and HYGROMETER.

Ninthly, That pure water makes the largeft part of mineral waters, where it is impregnated as a menftruum, with feveral ingredients that it diffolves or drinks up in its paffage through the earth.

Tenthly and laftly, the preceding enquiry affords confiderable light for difcovering practicable ways of making fea-water frefh and potable, and of preparing waters by art, fo as to render them fitter for the common œconomical ufes, and the fervice of many particular arts, as medicine, pharmacy, chemiftry, brewing, diftilling, &c.

Water is of the utmoft ufe in divers of the mechanical arts and occafions of life, as in the motion of mills, engines, fountains, and other machines, the conftruction of all which, fubfervient thereto, or founded thereon, as fiphons, pumps, &c. make the fubject of hydraulics. See the

the articles MILL, ENGINE, FOUNTAIN, MACHINE, HYDRAULICS, &c.

The laws, properties, &c. of this fluid, with refpect to the forefaid ufes, as its motion, gravitation, preffion, elevation, action, momenta and velocities, &c. which make the fubject of hydroftatics, may be feen under the article FLUID and HYDROSTATICS.

For the water-poife, or that inftrument which ferves to meafure the gravity, denfity, velocity, &c. of water, fee the article HYDROMETER.

For the afcent of water in capillary tubes, fee the article CAPILLARY.

For an account of the water-clock, the water-level, the water-organ, &c. See CLEPSYDRA, LEVEL, ORGAN, &c.

WATER, in hydrography, and geography, is a common or general name, applied to all liquid tranfparent bodies, gliding or flowing on the earth, in which fenfe water and earth are faid to conftitute our terraqueous globe. See EARTH.

In this fenfe, water is diftinguifhed with regard to the places where it is found, into fea-water, rain-water, fpring-water, well-water, ciftern-water, lake water, morafs-water, &c. See the articles SEA, RAIN, RIVER, SPRING, WELL, &c.

For the periodical changes to which the water of the fea is liable, fee the articles TIDES, FLUX, EBB, &c.

WATER, in medicine, pharmacy, &c. called alfo artificial and medicated waters, are a kind of liquors procured or prepared by art from divers bodies, principally of the vegetable tribe, having various properties, and ferving for various purpofes. Thefe waters are either fimple, or compound; fimple-waters are thofe procured from fome one vegetable body, the intention of which is to draw out the virtues of the herb, feed, flower, root, or the like, fo as it may be more conveniently given in that form than any other. The means whereby this feparation is effected, are either evaporation, infufion, decoction, or diftillation. See EVAPORATION, INFUSION, &c.

The fimple waters of chief virtue are the following ones, *viz.* dill-water, angelica-water, mint-water, rofemary-water, orange-flower-water, black-cherry-water, parfley-water, camomile-water, penyroyal-water, fennel-water, damafk rofe-water, hyffop-water, rue-water, juniper-water, elder-water, lovage-water, carminative-water, &c. for the virtues of each whereof we refer the reader to thofe afcribed to the feveral plants, or other bodies from whence the water is procured, which may be found under their proper heads in the courfe of this work.

Compound-waters, or thofe wherein feveral ingredients are ufed, are very numerous, and make a large article in commerce; fome prepared by the apothecaries, according to the difpenfatory prefcripts, for medicinal ufes; others by the diftillers, to be drank by way of dram; and others by the perfumers, &c. They are diftinguifhed by different epithets, &c. in refpect either of the fpecific virtues of the waters, or the parts of the body for the cure whereof they are intended, or the difeafes they are good againft, or the ingredients they are compounded of, or their different ufes, &c.

The moft confiderable among the clafs of compound-waters, are alexipharmic or alexiterial-waters, fuch as treacle-water, plague-water, milk-water, poppy-water, &c. alum-water, angelica-water, annifeed-water, apricot-water, aromatic-water, arthritic-water, bryony-water, carduus-water, water of feparation, or depart, cauftic-water, cephalic-water, chalybeat-water, cinnamon-water, clary-water, clove-water, cordial-water, cofmetic-water, gentian-water, gum-water, hepatic-water, honey-water, hungary-water, hyfteric water, iced or frozen-water, imperial-water, lime-water, aqua-mirabilis, or the wonderful-water, nephritic-water, ophthalmic water, orange-water, peach-water, poppy-water, pyony-water, rofe-water, fcordium-water, fpecific-water, fplenetic-water, ftomachic-water, ftyptic water, treacle-water, vulnerary-water, &c.

The ufes and preparations of moft of thefe, and feveral others, may be feen as they are arranged under their refpective names throughout the courfe of this work; but as thefe waters are exceeding numerous, and the manner of making them, is not always the fame, we muft refer the chemical or medical reader to the difpenfatories, wherein he will find, that every one gives his own method as the beft one.

We have only three general remarks to add, with regard to thofe intended for drinking. 1. That fuch wherein any thing is infufed, as bruifed fruits, pounded herbs, &c. or ground fpices, muft be always paffed through a filtre, to make them finer and purer. 2. That thofe made with brandy, or fpirit of wine,

are

are ufually diftilled after mixing their ingredients, which renders thofe liquors exceeding ftrong and dangerous. 3. That the waters which take their name from particular things, as cinnamon, &c. have often fome other ingredients, joined with them, according to the tafte or fmell required.

WATER, in anatomy, is applied to divers liquors or humours in the human body, fuch is the aqua phlegmatica, which is a foft ferous humour, contained in the pericardium, and wherein the heart fwims. See PERICARDIUM.

*Holy* WATER, a water prepared every Sunday in the romifh church, with divers prayers, exorcifms, &c. ufed by the people to crofs themfelves withal at their entrance to and going out of, church; and pretended to have the virtue of wafhing away venial fins, driving away devils, preferving from thunder, diffolving charms, fecuring from, or curing difeafes, &c. Many of the reformed take the ufe of holy-water to have been borrowed from the luftral water of the antient Romans. See LUSTRATION.

WATER ORDEAL, or TRIAL, among our anceftors, was of two kinds, by hot and by cold, water. Trial or purgation, by boiling or hot water, was a way of proving crimes, by immerging the body, or the arm, in hot water, with divers religious ceremonies. In the judgment by boiling water, the accufed, or he who perfonated the accufed, was obliged to put his naked arm into a caldron full of boiling water, and to draw out a ftone thence placed at a greater or lefs depth, according to the quality of the crime. This done, the arm was wrapped up, and the judge fet his feal on the cloth, and at the end of three days they returned to view it, when if it were found without any fcald, the accufed was declared innocent. The nobles or great perfonages purged themfelves thus, by hot water, and the populace, by cold water. The trial, or purgation, by cold water, was thus: after certain prayers and other ceremonies, the accufed was fwaddled, or tied up, all in a pelotoon or lump, and thus caft into a river, lake, or veffel, of cold water, where if he funk he was held criminal, if he floated, innocent. In the levitical law, we find mention made of water which ferved to prove, whether or no a woman was an adulterefs; the formula, as it was performed by the prieft, may be feen in the fifth chapter of the book of Numbers.

WATER, among jewellers, is properly the colour or luftre of diamonds and pearls. The term, though lefs properly, is fometimes ufed for the hue or colour of other ftones. See DIAMOND and PEARL.

WATER-BAILIFF, is an officer in fea-port towns, appointed for the fearching of fhips; and in London, the water-bailiff hath the fupervifing and fearch of fifh, brought thither; and the gathering of the toll arifing from the Thames; his office is likewife to arreft men for debt, &c. or other perfonal or criminal matters upon the river Thames.

WATER-*Beetle*, *Dytifcus*, in zoology. See the article DYTISCUS.

WATER-SCORPION, *nepa*, in zoology. See the article NEPA.

WATER-BORNE, in the fea-language. A fhip is faid to be water-borne, when fhe is, where there is no more water than will barely bear her from the ground; or when lying even with the ground, fhe firft begins to float or fwim.

WATER-COLOURS, in painting, are fuch colours as are only diluted and mixed up with gum-water, in contradiftinction to oil-colours.

The ufe of water-colours makes what we call limning, as that of oil-colours does painting, properly fo called. See the articles COLOUR and LIMNING.

*Dead*-WATER, in the fea-language, is the eddy-water that follows the ftern of a fhip, not paffing away fo faft as that which flides by her fides.

WATER, or SEA-GAGE. See GAGE.

WATER-GANG, a channel cut to drain a place by carrying off a ftream of water.

WATER-LINE *of a fhip*, a line which diftinguifhes that part of her under water from that above, when fhe is duly laden.

WATER-MEASURE. Salt, fea-coal, &c. while aboard veffels in the pool or river, are meafured with the corn-bufhel heaped up; or elfe five ftriked pecks are allowed to the bufhel. This is called water-meafure. See the article MEASURE.

WATER-MEN, are fuch as row in boats, or ply on the river Thames, in the government of whom the lord-mayor of London, and court of aldermen there, had always great power. They ftill have the appointing of their fares, the taking more than which, makes them liable to a fine of 40 s. and half a year's imprifonment. The fares affeffed are, from London-bridge to Limehoufe, Ratcliff-crofs, &c. oars, 1 s. fcullers, 6 d. to Wapping-dock, Rother-

London-Bridge

WATER-WORKS.

T. Jeffry

Rotherhith church-ſtairs, &c. oars, 6 d. ſcullers 3 d. from either ſide of the water above the Bridge to Lambeth, and Vaux-hall, oars, 1 s. ſcullers, 6 d. all the ſtairs between London-bridge and Weſtminſter, oars, 6 d. ſcullers, 3 d. Watermens boats ought to be twelve feet and a half in length, and four and a half in breadth; and no apprentice to any waterman ſhall take upon him the care of a boat till he is ſixteen years of age, if a waterman's ſon; and ſeventeen, if a landman's ſon, unleſs he has worked with ſome able waterman two years, &c. No tilt-boat, or row-barge, &c. may take in above thirty-ſeven paſſengers, or three more by the way; nor any boat above eight paſſengers, and two by the way, elſe they forfeit 5 l. for the firſt offence, and 10 l. for the ſecond, &c. and if any perſon be drowned when a greater number are taken in, the waterman is declared guilty of felony, and may be tranſported, &c.

Water-shoot, a young ſprig which ſprings out of the root or ſtock of a tree.

Water-shot, in the ſea-language, a ſort of riding at anchor when a ſhip is moored neither croſs the tide, nor right up and down; but quartering betwixt both.

Water-table, in architecture, a ſort of ledge left in ſtone, or brick-walls, about eighteen or twenty inches from the ground, from which place the thickneſs of the wall begins to abate. See Wall.

Water-way, in a ſhip, is a ſmall ledge of timber, lying fore and aft on the deck, cloſe by her ſides, to keep the water from running down there.

Water-wheel, an engine for raiſing water in great quantity out of a deep well. See *Perſian* Wheel.

Water-works, in general, denote all manner of machines moved by, or employed in raiſing or ſuſtaining water; in which ſenſe, water-mills of all kinds, ſluices, aqueducts, &c. may be called water-works. See Mill, &c.

The term water-works, however, is more particularly uſed for ſuch machines as are employed only in raiſing water.

We ſhall begin with the deſcription of that at London-bridge, which is moved by the common tide-water of the river Thames. AB (plate CCXCVIII.) the axle-tree of the water-wheel, is nineteen feet long, three feet diameter, in which C, D, E, F, are four ſets of arms, eight in each place, on which are fixed G, G, G, G, four rings, or ſets of felloes, in diameter twenty feet; and the floats H, H, H, fourteen feet long, and eighteen inches deep, being about twenty-ſix in number.

The wheel lies with its two gudgeons, or center-pins A B, upon two braſſes in the pieces M N, which are two great levers, whoſe fulcrum, or prop, is an arched piece of timber L: the levers being made circular on their lower ſides to an arch of the radius M O, and kept in their places by two arching ſtuds fixed in the ſtock L, through two mortiſes in the lever M N. The wheel is, by theſe levers, made to riſe and fall with the tide, which is performed in this manner: the levers M N are ſixteen feet long; from M, the fulcrum of the lever, to O the gudgeon of the water-wheel, ſix feet; and from O to the arch at N, ten feet. To the bottom of the arch N is fixed a ſtrong triple chain P, made after the faſhion of a watch-chain, but the links arched to a circle of one foot diameter, having notches, or teeth, to take hold of the leaves of a pinion of caſt iron Q, ten inches diameter, with eight teeth in it moving on an axis. The other looſe end of this chain has a large weight hanging at it, to help to counterpoiſe the wheel, and preſerve the chain from ſliding on the pinion. On the ſame axis is fixed a cog-wheel R, 6 feet diameter, with 48 cogs. To this is applied a trundle, or pinion S, of ſix rounds, or teeth; and upon the ſame axis is fixed T, a cog-wheel of fifty-one cogs, into which the trundle V, of ſix rounds, works; on whoſe axis is a winch or windlaſs W, by which one man, with the two windlaſſes, raiſes or lets down the wheel, as there is occaſion. And becauſe the fulcrums of theſe levers M N are in the axis of the trundle K, *viz.* at M or X, in what ſituation ſoever the wheel is raiſed or let down, the cog-wheel I, I, is always equidiſtant from M, and works or geers truly.

By means of this machine the ſtrength of an ordinary man will raiſe about fifty ton weight.

I, I, is a cog-wheel fixed near the end of the great axis, eight feet diameter, and 44 cogs working into a trundle K, of $4\frac{1}{2}$ feet diameter, and 20 rounds, whoſe axis or ſpindle is of caſt iron 4 inches in diameter, lying in braſſes at each end, as at X.

Z Z is a quadruple crank of caſt iron, the metal being ſix inches ſquare, each of the necks being turned one foot from the center,

center, which is fixed in braffes at each end in two head-ftocks faftened down by caps. One end of this crank at Y is placed clofe abutting to the end of the axle-tree X, where they are at thofe ends fix inches diameter, each having a flit in the ends, where an iron wedge is put, one half into the end X, the other half into Y, by means of which the axis X turns about the crank Z Z.

The four necks of the crank have each an iron fpear, or rod, fixed at their upper ends to the refpective libra, or lever, *a* 1, 2, 3, 4, within three feet of the end, Thefe levers are twenty-four feet long, moving on centers in the frame *b b b b*; at the end of which, at *c* 1, 2, 3, 4, are jointed four rods with their forcing plugs working into *d* 1, 2, 3, 4, four caft iron cylinders four feet three quarters long, feven inches bore above, and nine below where the valves lie, faftened by fcrewed flanches over the four holes of a hollow trunk of caft iron, having four valves in it juft over *e e e e*, at the joining on at the bottom of the barrels, or cylinders, and at one end a fucking pipe or grate *f*, going into the water, which fupplies all the four cylinders alternately.

From the lower part of the cylinders *d* 1, *d* 2, *d* 3, *d* 4, come out necks turning upward arch-wife, as *g g g g*, whofe upper parts are caft with flanches to fcrew up to the trunk *h h h h*; which necks have bores of feven inches diameter, and holes in the trunk above communicating with them, at which joining are placed four valves. The trunk is caft with four boffes, or protuberances, ftanding out againft the valves to give room for their opening and fhutting; and on the upper fide are four holes ftopped with plugs, to take out on occafion, to cleanfe the valves. One end of this trunk is ftopped by a plug *i*. To the other iron pipes are joined, as *i* 2, by flanches, through which the water is forced up to any height or place required.

Befides thefe four forces, there are four more placed at the other ends of the libræ, or levers (not fhewn here to avoid confufion, but to be feen on the left hand) the rods being fixed at *a* 1, 2, 3, 4, working in four cylinders, with their parts *d d*, &c. *e e*, *f*, *g g*, and *i*, as before defcribed, ftanding near *k k*.

At the other end of the wheel (at B) is placed all the fame fort of work as at the end A is defcribed, *viz.*

The cog-wheel I.
The trundle K.
The fpindle X.
The crank Y, Z.
The fucking pipes *f*.
The four levers *a c*, *a c*, &c.
Eight forcing rods, *a d*, *a d*, &c.
Eight cylinders, *d e*, *d e*, &c.
Four trunks, fuch as *e e*, *h h*.
Two forcing pipes, as *i*.
So that one fingle wheel works 16 pumps.

All which work could not be drawn in one perfpective view, without making it very much confufed.

*A calculation of the quantity of water raifed by the engines at London bridge.*

| | |
|---|---|
| In the firft arch next the city is one wheel with double work of | 16 forcers. |
| In the third arch { Firft wheel double work at one end, and fingle at the other | 12 |
| Second wheel in the middle - - - - - - | 8 |
| Third wheel - - - - - - - - | 16 |
| In all | 52 forcers. |
| One revolution of a wheel makes in every forcer - - | $2\frac{1}{5}$ ftrokes. |
| So that one turn of the four wheels makes - - - - | 114 ftrokes. |
| When the river is at beft, the wheels go fix times round in a minute, and but $4\frac{1}{2}$ at middle water - - - | 6 |
| The number of ftrokes in a minute - - - - | 684 |
| The ftroke is $2\frac{1}{2}$ feet in a 7 inch bore, raifes - - - | 3 } alegallons. |
| They raife per minute - - - - - | 2052 } |

That is, 123120 gallons = 1954 hogfheads per hour, and at the rate of 46896 hogfheads in a day, to the height of 120 feet.

This is the utmoft quantity they can raife, fuppofing there were no imperfections or lofs at all.

But it is certain, from the confiderations following, that no engine can raife fo much as will anfwer the quantity of water the cylinder contains in the length of the forces, or pifton's motion. For,

Firft, opening and fhutting of the valves lofe nearly fo much of that column, as the height they rife and fall.

Secondly, no leather is ftrong enough for the pifton, but there muft continually flip, or fqueeze by, fome water, when it is raifed

raiſed to a great height; and, when the column is ſhort, it will not preſs the leather enough to the cylinder, or barrel: but, eſpecially at the beginning or firſt moving of the piſton, there is ſo little weight on it, that, before the leather can expand, there is ſome loſs.

Thirdly, and this loſs is more or leſs, as the piſtons are looſer or ſtraiter leathered.

Fourthly, when the leathers grow too ſoft, they are not capable of ſuſtaining the pillar to be raiſed.

Fifthly, if they are leathered very tight, ſo as to loſe no water, then a great part of the engine's force is deſtroyed by friction.

By ſome experiments accurately made on engines, whoſe parts are large and excellently performed, they will loſe one fifth and ſometimes one fourth of the calculated quantity.

However, the perfections or errors of engines are to be compared together, by the calculated quantities of forces; for as they differ in thoſe, they will proportionably differ in their actual performances.

*The power by which the wheels are moved.*

The weight of the pillar of water on a forcer 7 inches diameter and 120 feet high.

7 × 7 = 49 lb. The pounds avoirdupoiſe in a yard, nearly.
40 yards high.
1960 lb. on one forcer.
8 forcers always lifting.
The whole weight 15680 lb. = 140 Cwt. = 7 ton weight on the engine at once.

Then the crank pulls the libra 3 feet from the forcer, and 8,3 feet from the center,

7 ton
× 11.3
8,3)79.1(9,5. ton on the crank.
Wallower - - 2,2)9,5(4,3 ton on trundle.
The ſpur-wheel - - - 4
Radius of the great wheel 10)17,2(1,72 ton.
20
The force on the floats 18 Cwt. 40 lb. 34,40 Cwt.

But to allow for friction and velocity, may be reckoned 1 ton ½.

The ladles, or paddles, 14 feet long, 18 inches deep, = 22,4 ſquare feet.
The fall of water is at a mean - - - - - - 2 feet.
44,8
6 gallons in a cubic foot.
268,8
10, lb. in a gallon.
112) 2688 (24 hundred.

The velocity of the water, 4 feet in 21‴ of time.
21‴ — 4 feet : : — 60″ : = 685 feet per minute.
The velocity of the wheel = 310 feet per minute.
Quantity expended on the wheel, according to the velocity of the ſtream, 1433 hogſheads *per* ſecond.
But at the velocity of the wheel 645 hogſheads *per* ſecond.
The velocity of the wheel to the velocity of the water, as 1 to 2, 2.

Fig. 1. plate CCXCIX. repreſents a curious machine for raiſing water, executed at Nynphenbourg, by the count de Whal, maſter of the works to the elector of Bavaria. It raiſes water ſixty feet high into a reſervoir, for the uſe of the elector's gardens.

The water of the canal, falling down the inclined plane at Q, turns the large wheel repreſented in the figure, the circumference of which, by cogs, moves the arbor D, and the ſame on the other ſide; to thoſe are faſtened the piſtons of ſixteen forcing pumps G, four on each ſide the arbor, as repreſented in the figure.

From each of theſe pumps is a tube, through which the water is forced into the pipe O, and from thence through the pipe P, which conveys it into the reſervoir. Theſe pumps are faſtened together by pieces of timber, with iron clamps, to make them firm, as may be ſeen in the figure.

This is a very good machine, and deserves to be imitated, either in whole or in part, when water is to be raised.

We shall conclude this account of water-works with a description of two machines much used in Holland.

Fig. 2. *ibid.* represents another machine for raising water: it is moved by the man C, walking in the wheel C, as is plain from the figure. The large wheel A, A, G, has seven square holes in its circumference, as A, A, A, which run in a spiral form to the axis B. The water, by the motion of the wheel whose circumference is constantly immersed in it, runs along these spiral tubes to the axis; from whence it is conveyed to D, where it is discharged, and by means of the trough and spout F, F, conveyed to the reservoir destined to receive it.

Fig. 3. *ibid.* represents a machine used by the Dutch for freeing their dykes of water. It consists of five pieces of board, forming a kind of scoop, as B; the handle C is suspended by a rope fastened to three poles placed triangularly, and fastened together at A, as is plain from the figure. As the working of this machine consists in balancing it, and directing it so that, after having filled it with water, it may throw it on the other side of the dam, we shall only observe that the labourer at two strokes can draw only half a cubic foot of water in four seconds, which amounts to four hundred cubic feet in an hour.

Fig. 4. *ibid.* is another machine of the same kind with that above described. The figure sufficiently explains its use. It is worked by two men, one at A, and another at D. The machine moves on the center B, and each end is immersed alternately in the water; by which means it flows into each end of the machine, where there is a valve, to prevent its returning; and, by the alternate motion of the machine, the water so taken up is conveyed to B, and from thence, by the spout C, over the dam.

WATERFORD, a port town of Ireland, capital of the county of Waterford, situated on the river Sure, eight miles north of the sea: west longitude 7°, north latitude 52° 12′.

It is one of the largest cities in Ireland, and has a good foreign trade.

WATERING, in the manufactures, is to give a lustre to stuffs, &c. by wetting them lightly with gum-water, and then passing them through the press, or calender, whether hot or cold.

The gum-water ought to be pure, thin, and clear, otherwise the folds of the stuff will stick together: the operation must also be performed when the water is very hot, that it may penetrate.

WATLINGTON, a market-town of Oxfordshire, situated twelve miles south-east of Oxford.

WATTON, a market-town of Norfolk, sixteen miles south-west of Norwich.

WAVE, *unda*, in philosophy, a cavity in the surface of water, or other fluid, with an elevation aside thereof. See FLUID.

Sir Isaac Newton explains the nature of waves in water after the following manner: Let AB and CD (pl. CCXCVII. fig. 2. n° 1.) be the surface of water quiescent in the upright leg KL, MN, of a received tube. And if the water be put into motion, and ascends in the leg KL to EF it will descend in the leg MN to GH; so that EA = DH. Again, let PV be a pendulum vibrating in the cycloid RPS, its length VP, from the point of suspension to the center of oscillation, is equal to half the length of the water in the tube; let P be the lowest point, and PQ an arch of the cycloid, equal to the altitude AE.

The force by which the water is alternately accelerated and retarded in its motion in the tube, is the excess of the weight of water in either leg above the weight in the other; and, therefore, when the water in the leg KL ascends to EF, and in the other leg descends to GH, that force is equal to the weight of the two equal quantities of water AEFB + CGHD = 2 AEFB; and, therefore, is to the weight of the whole water, as EA to VP, or as PQ to PR; because the semi-cycloid PR is equal to the length of the pendulum which describes it, from the nature of the curve.

All the power by which the weight P is in any point Q accelerated or retarded in the cycloid, is, to its whole weight, as the distance PQ from the lowest point P, to the length of the semi-cycloid PR. Wherefore, as the moving forces of the water and pendulum are at first quiescent, those powers will move them equally in equal times, and cause that they go forwards and backwards together with a reciprocal motion: all which is easily deduced from what has been said of the nature

ture of the cycloid, the motion of heavy bodies, and the forces of bodies in motion.

Hence it follows, that, whether the distance AE be great or ſmall, the reciprocations of the water will all be performed in equal times. Alſo, it follows, that if the whole length of the water be 78,4 inches, each reciprocation, or aſcent and deſcent of the water, will be performed in one ſecond of time; becauſe a pendulum of half that length vibrates in that time. Laſtly, if the length of the aqueous canal be increaſed or diminiſhed, the time of each reciprocation will be increaſed or diminiſhed in the ſubduplicate ratio of the length.

When the nature of waves in water is conſidered, it will be found to agree very nearly with the motion of the water in the tube abovementioned; and, conſequently, their motion will be ſimilar to that of a pendulum. For let E F G (*ibid.* nº 2.) repreſent the level ſurface of water when it is not agitated ſo as to produce waves; when it is thus agitated, let A B C D repreſent the wavy ſurface, A C the higheſt parts of the waves, and B D the loweſt or concave part. Then it is evident, the weight of the water at A above E G will cauſe it to deſcend as far below the level to B; and with the motion acquired by that deſcent, it it will again aſcend to the ſame height C, and ſo produce a conſtant ſucceſſion of waves in the watery ſurface, after the ſame manner as was ſhewn in the tube.

Hence it follows, that becauſe the length of the whole water to be moved is from the higheſt point A to the loweſt point B, if the length of a pendulum be half A B, it will oſcillate once while the water deſcends from A to B; and in another oſcillation, it will aſcend from B to C; and ſo on. So that a wave will paſs through its whole length in the time of two oſcillations; and, therefore, in the time of one oſcillation of a pendulum four times as long, or equal to A B C.

Whence, becauſe A B C, in very large and wide waves, is nearly equal to the breadth A C; therefore, when the waves are 39,2 inches broad, they will undulate in one ſecond of time; and, conſequently, ſince the times of all the undulations are equal, there will be $39{,}2 \times 60 = 2352$ inches, or 196 feet, run through by a wave in one minute; which is 11760 feet *per* hour. Hence, alſo, the velocity of greater or leſſer waves will be increaſed or diminiſhed in the ſubduplicate proportion of their breadth: that is, if $V =$ velocity of the greater waves A B C D, and $v =$ velocity of the leſſer waves *a. b. c. d. e. f.* &c. then it will be $V : v :: \sqrt{AC} : \sqrt{ac}$. Becauſe the velocities and times of bodies, moved in any manner by gravity, are proportional to the ſquare roots of the perpendicular altitudes, and thoſe altitudes are as the lengths of pendulums; and, therefore, as the breadth of waves.

The waves of the ſea are of two kinds, natural and accidental. The natural waves are thoſe which are exactly proportioned in ſize to the ſtrength of the wind, whoſe blowing gives origin to them. The accidental waves are thoſe occaſioned by the wind's reacting upon itſelf by repercuſſion from hills and mountains, or high ſhores, and by the waſhing of the waves themſelves, otherwiſe of the natural kind, againſt rocks and ſhoals: all theſe caſes give the waves an elevation, which they can never have in their natural ſtate.

Mr. Boyle has proved, by numerous experiments, that the moſt violent wind never penetrates deeper than ſix feet into the water; and it ſhould ſeem a natural conſequence of this, that the water moved by it can only be elevated to the ſame height of ſix feet from the level of the ſurface in a calm: and this ſix feet of elevation being added to the ſix of excavation, in the part whence that water ſo elevated was raiſed, ſhould give twelve feet for the utmoſt elevation of a wave. This is a calculation that does great honour to its author; for count Marſigli meaſured carefully the elevation of the waves near Provence, and found that, in a very violent tempeſt, they aroſe only to ſeven feet above the natural level of the ſea, and this additional foot in height he eaſily reſolved into the accidental ſhocks of the water againſt the bottom, which was, in the place he meaſured them in, not ſo deep as to be out of the way of affecting the waves; and he allows that the addition of one ſixth of the height of a wave, from ſuch a diſturbance from the bottom, is a very moderate alteration from what would have been its height in a deep ſea; and concludes, that Mr. Boyle's calculation holds perfectly right in deep ſeas, where the waves are purely natural, and have no accidental cauſes to render them larger than their juſt proportion. In deep water, under the high ſhores of the ſame

part of France, this author found the natural elevation of the waves to be only five feet; but he found alſo, that their breaking againſt rocks, and other accidents to which they were liable in this place, often raiſed them to eight feet high.

We are not to ſuppoſe, from this calculation, that no wave of the ſea can riſe more than ſix feet above its natural level in open and deep water; for waves immenſely higher than theſe are formed, in violent tempeſts, in the great ſeas. Theſe, however, are not to be accounted waves in their natural ſtate, but they are ſingle waves formed of many others; for in theſe wide plains of water, when one wave is raiſed by the wind, and would elevate itſelf up to the exact height of ſix feet, and no more, the motion of the water is ſo great, and the ſucceſſion of the waves ſo quick, that, during the time this is riſing, it receives into it ſeveral other waves, each of which would have been at the ſame height with itſelf; theſe run into the firſt wave, one after another, as it is riſing: by this means its riſe is continued much longer than it naturally would have been, and it becomes terribly great. A number of theſe complex waves ariſing together, and being continued in a long ſucceſſion by the continuation of the ſtorm, make the waves ſo dangerous to ſhips, which the ſailors in their phraſe call mountains high.

WAVE OFFERING, in jewiſh antiquity, a ſacrifice offered by agitation, or waving, towards the four cardinal points of the compaſs. See the article SACRIFICE.

WAVED, WAVY, or WAVEY, in heraldry, is ſaid of a bordure, or any ordinary, or charge, in a coat of arms, having its out-lines indented, in manner of the riſing and falling of waves: it is uſed to denote, that the firſt of the family in whoſe arms it ſtands, acquired its honours for ſea-ſervice.

WAVING, in the ſea-language, is the making ſigns to a veſſel to come near or keep off.

WAVREN, or GAVEREN. See the article GAVEREN.

WAX, or *Bees*-WAX, in natural-hiſtory, a firm and ſolid ſubſtance, moderately heavy, and of a fine yellow colour, formed by the bees from the farina of flowers, which they work up and compreſs into a maſs, or ſort of cake, and of which they form their honey-combs; from whence it is obtained by heating and ſtraining them through a linen cloth, or by preſſing them betwixt iron-plates, &c. The beſt ſort is that of a lively yellow colour, and an agreeable ſmell, ſomewhat like that of honey: when new it is toughiſh, yet eaſy to break; but by age it becomes harder and more brittle, loſes its fine colour, and in a great meaſure its ſmell. See the article HONEY-COMB.

From the common yellow wax, by the mere effect of ſun and air, or by what is called bleeching, is formed what we term white-wax, and ſome, very improperly, virgin-wax. As the greater the ſurface is in proportion to the quantity, the ſooner and more perfectly this operation is performed. The uſual way is to melt the wax in hot water; when melted, they preſs it through a ſtrainer of tolerable fine linen, and pour it into round and very ſhallow moulds. When hardened by cooling, it is taken out and expoſed to the ſun and air, ſprinkling it now and then with water, and often turning it: by this means it ſoon becomes white. The beſt ſort is of a clear and almoſt tranſparent whiteneſs, dry, hard, brittle, and of an agreeable ſmell, like that of the yellow wax, but much weaker.

The common yellow wax is of very great uſe both in medicine and in many of the arts and manufactures. It is ſometimes given internally, as in dyſenteries, and other eroſions of the inteſtines; but its great uſe is in the making ointments and plaſters for external uſe, and the greater part of thoſe of the ſhops owe their conſiſtence to it. The white wax is alſo an ingredient in ſome of the cerates and ointments of the ſhops; and is uſed in making candles, and in many of the nicer arts and manufactures, where wax is required.

Bees-wax, on being imported, pays a duty of 9 s. $6\frac{20}{100}$d. the hundred weight, and draws back, on exportation, 8 s. $7\frac{1}{2}$d.

*Preparations of* WAX. The butter and oil of wax are thus prepared: Cut the wax in pieces and put them into a retort, which muſt be half filled with theſe pieces; and the reſt of the retort being filled with ſand, it muſt be placed in a ſand furnace. At firſt an acid ſpirit ariſes, and afterwards a thick oil, called the butter of wax, ſticks in the neck of the retort, unleſs it be heated by applying a live coal. This may be rectified into

into a thin oil, by diſtilling it ſeveral times, without addition, in a ſand-heat. The butter is an extremely ſoft and anodyne unguent; highly emollient and relaxing; agreeable to the nerves; and, when rubbed on contracted limbs, proves of great benefit to them. It is an excellent liniment for the piles, and takes off the pain attending them in a very ſudden and ſurprizing manner. It alſo keeps the ſkin ſoft, and is one of the beſt things known to keep it from cracking or chopping in the winter.

The oil of wax, has alſo a very ſingular virtue in curing contracted tendons and reſtoring flexibility to the parts. It cures chapped nipples in women who give ſuck beyond any other application, and is as ſucceſsful againſt chapped lips, and the cracking of the ſkin of the hands, only rubbing them once in three or four days with it. It is alſo of great uſe in diſcuſſing cold tumours ariſing on the face, and thoſe on the fingers in winter.

*Sealing*-WAX is made in the following manner: Take one pound of bees-wax; three ounces of fine turpentine; olive-oil, and roſin, finely powdered, of each one ounce: when they are well melted, and the droſs taken off, put in an ounce and a half of vermillion, or red-lead, finely ground, and ſtir them together till they are well incorporated: and when this mixture grows a little cool roll it into ſticks, or in any other form. If you would have it black, inſtead of vermillion, or red-lead, put in lamp-black. The ſoft, red, and green wax, uſed in large ſeals to ſome of our law-writings, are thus made: Melt bees-wax over a gentle heat, with ſuch a proportion of venice turpentine as, when cold, will give it the due conſiſtence: this is determined by repeated trials, firſt putting in but little turpentine, and afterwards more and more, till by dropping a piece upon a marble to cool, it is found of the true conſiſtence. They then colour it with red-lead, or vermillion, or with verditer, or whatever colours they pleaſe; the mixture in this ſtate receiving any.

*Grafting*-WAX, a compoſition ſerving to bind the graft to the cleft of the ſtock. For the manner of making which, ſee *Methods of* GRAFTING.

*To imitate fruit in* WAX. Take the fruit and bury it half way in clay; oil its edges, and that part of the fruit which is uncovered; then nimbly throw on its tempered alabaſter or plaſter of Paris, to a conſiderable thickneſs. When this is grown dry and hard, it makes the half mould; the ſecond half of which may be obtained in the ſame manner. The two parts of the mould being joined together, a little bees-wax melted and brought to a due heat, being poured through a hole made in a convenient part of the mould, and preſently ſhook therein, will repreſent the original fruit.

WAX-WORK, the repreſentation of the faces, &c. of perſons living or dead; made by applying plaſter of Paris in a kind of paſte, and thus forming a mould containing the exact repreſentation of the features. Into this mould melted wax is poured, and thus a kind of maſks are formed; which being painted and ſet with glaſs eyes, and the figures dreſſed in their proper habits, they bear ſuch a reſemblance that it is difficult to diſtinguiſh between the copy and the original.

WAXING, in chemiſtry, the preparation of any matter to render it fit and diſpoſed to liquify, or melt, which of itſelf it was not.

This is frequently done to enable things to penetrate into metals and other ſolid bodies.

WAY, a paſſage or road. See ROAD.

The roman ways are divided into conſular, prætorian, military, and public; and of theſe we have four remarkable ones in England: the firſt, Watling-ſtreet, or Watheling-ſtreet, leading from Dover to London, Dunſtable, Toweſter, Atterſton, and the Severn extending as far as Angleſea in Wales. The ſecond, called Hikenild, or Ikenild-ſtreet, ſtretches from Southampton over the river Iſis at Newbridge; thence by Camden and Lichfield; then paſſes the Derwent, near Derby, and ends at Tinmouth. The third, called Foſſe-way, becauſe in ſome places it was never perfected, but lies as a large ditch, leads from Cornwal through Devonſhire, by Tethbury, near Stow in the Wolds; and beſide Coventry to Leiceſter, Newark, and ſo to Lincoln. The fourth, called Erming, or Erminage-ſtreet, extends from St. David's, in Wales, to Southampton.

*High* WAY. See HIGH-WAY.

*Milky*-WAY. See the article GALAXY.

WAY *of a ſhip*, is ſometimes the ſame as her rake, or run forward or backward: but this term is moſt commonly underſtood of her ſailing. Thus when ſhe goes a-pace, it is ſaid that ſhe hath a good way, or makes a freſh way. So when

when an account is kept how faſt ſhe fails by the log, it is called keeping an account of her way; and becauſe moſt ſhips are apt to fall a little to leeward of their true courſe, they always in caſting up the log-board, allow ſomething for her leeward way.

WAY *of the rounds*, in fortification, is a ſpace left for the paſſage of the rounds between the rampart and the wall of a fortified town. This is not now much in uſe; becauſe the parapet, not being above a foot thick, is ſoon overthrown by the enemy's cannon.

WAY-WISER, an inſtrument otherwiſe called perambulator. See the article PERAMBULATOR.

WAY-WODE, a title given to the governors of the chief places in the empire of Muſcovy, as alſo in Poland.

WEAR, or WEER, a great ſtank or dam in a river, fitted for the taking of fiſh, or for conveying the ſtream to a mill.

New wears are not to be made, or others altered, to the nuſance of the public, under a certain penalty.

WEASEL, in zoology, a ſpecies of Muſtela, with the tip of the tail black. See the article MUSTELA.

This is a ſmaller animal than the pole-cat: the head is ſmall, of an ovated form, and ſharp at the ſnout: the ears are ſmall, ſhort and patulous: the eyes of a fierce aſpect: the mouth well furniſhed with teeth: the upper jaw longer than the under: the body is about eight inches long, and ſlender: the tail is a third part the length of the body: the legs are ſhort and ſlender: the feet have five toes armed with ſharp claws: the whole body is covered with a fine and tolerably long fur: the back is of a darkiſh colour, and the belly is white.

WEATHER, the ſtate or diſpoſition of the atmoſphere with regard to heat, cold, wind, rain, froſt, &c.

At it is in the atmoſphere that all plants and animals live, and as that appears to be the great principle of moſt animal and vegetable productions, alterations, &c. there does not ſeem any thing, in all philoſophy, of more immediate concernment to us than the ſtate of the weather, and a knowledge of the great influence it has on our bodies. What vaſt, but regular, alterations a little turn of weather makes in a tube filled with mercury, or ſpirits of wine, or in a piece of ſtring, &c. every body knows, in the common inſtance of barometers, thermometers, &c. and it is owing partly to our inattention, and partly to our unequal and intemperate courſe of living, that we do not feel as great and regular ones in the tubes, chords, and fibres of our own bodies.

WEATHER-COCK, or WEATHER-VANE, a moveable vane in form of a cock, or other ſhape, placed on high, to be turned round according to the direction of the wind, and point out what quarter the wind blows from. See WIND.

WEATHER-GLASSES, are inſtruments contrived to indicate the ſtate or diſpoſition of the atmoſphere, and the various alterations in the weather: ſuch are barometers, thermometers, hygrometers, &c. See the articles BAROMETER, THERMOMETER, &c.

WEATHER-GAGE, in the ſea-language. See the article GAGE.

WEATHERING, among ſailors, ſignifies the doubling, or ſailing by a head-land, or other place.

WEAVING, the art of working a web of cloth, ſilk, or other ſtuff, in a loom with a ſhuttle. For the manner of performing which ſee the article CLOTH, &c.

WEAVING-LOOM, a machine for weaving cloth, ſilk, &c. by raiſing the threads of the warp in order to throw in the ſhoot, and ſtrike it cloſe. Of theſe there are various kinds, diſtinguiſhed by the different ſorts of cloths, ſtuffs, ſilks, &c. in which they are employed, and which are chiefly diſtinguiſhed by the number and variety of the threads they raiſe in order to work the warp, either plain or in figures, by making more or leſs of the woof or ſhoot appear through the warp. In order to give a general idea of weaving, we ſhall here deſcribe the parts of the common weaver's loom. See plate CCXCII. fig. 2. in which 9,9, are the loom poſts: 10. the croſs-bars: 11. the batten; which ſerves to ſtrike in, and cloſe more or leſs the threads of the woof: 12. the cap of the batten, or a long bar; which the weaver takes hold of in one hand and then in the other: 13. the block, or under part of the ſame, containing the reed within the lower bar: 14. the croſs-piece, or burdon and pin, which helps to make the batten moveable: 15. the gallows; a piece of wood ſuſpending the pully, on which the cord moves that is tied to the two lams: 16. the breaſt-bar; a flat ſquare piece of wood, with an opening in it to let the ſtuff through, which is rolled

rolled on the knee-roll: 17. the cane-roll, which the warp is turned on at the other end of the loom: 18. the reed: 20. pullies, upon which the cords roll that are faſtened to the lams: 21. the tumbler; which is a cord that paſſes from one lam to the other over the pully 20, and cauſes the working of the lams by its aſcending and deſcending: 22. the muffle in which the pully acts: 23. a ſkain, or leiſh, cut into proper lengths, to mend the leiſhes of the harneſs that happen to break: 24. a bobbin of the warp, to mend the threads of the warp that occaſionally break: 25. lizard thread, to mend thoſe of the lizier that happen to break; and which, eſpecially in cloth, are very different from the warp: 26. the box to hold the quills: 28. the foot-bar: 29. the trundles, or moveable bars, tied with two cords to the lower virgee of each lam. When the foot preſſes a treadle, the lam that is faſtened to it ſinks, and the other riſes by the help of the tumbler: 30. the foot-ſtep: 31. the temple; a double flat ruler, having ſmall teeth at the extremities; it may be lengthened or ſhortened by the help of a catch that is in one of the rulers, and introduced in a groove in the other ruler. The teeth in the extremities are faſtened in the lizier of the work, by which means it is kept of an equal breadth; and as the work advances the temple is moved forwards: 32. the ſhuttle ſeen in front and profile: 33. the knee-roll, on which the work is rolled as it is wove: 34. the tantow; an iron leaver to turn the knee-roll: 35. the reed ſeen ſeparate.

WEB, a ſort of tiſſue, or texture formed of threads interwoven with each other; ſome whereof are extended in length, and called the warp; and others drawn acroſs, and called the woof. See the articles CLOTH, WARP, *&c.*

*Spider's* WEB, or COBWEB. See the article COBWEB.

WEDGE, *cuneus*, one of the mechanical powers, as they are called. See POWER.

The wedge is a triangular priſm, whoſe baſes are equilateral acute-angled triangles. See the articles PRISM, *&c.*

The power of the wedge A C B H (plate CCXCVII. fig. 3.) is evident from its conſiſting of two equal inclined planes, A H C and B H C: but as it is chiefly uſed to ſeparate the adhering parts of wood, the coheſion of which is every where variable and uncertain, there can be no regular calculation of the actual effect of the wedge, in this caſe. But if we ſuppoſe the power of coheſion in the wood A D E B to be uniform, or to make every where an equal reſiſtance to the wedge A B C, dividing its parts A F and B G; then the power of the wedge would be to the reſiſtance of the wood, as their velocities inverſely, that is, as the ſpaces moved through in the ſame time, that is, as the height of the wedge H C to half its width A H.

WEDNESDAY, the fourth day of the week, ſo called from a ſaxon idol named Woden, ſuppoſed to be Mars, worſhipped on this day.

*Aſh* WEDNESDAY, the firſt day of Lent, ſo called from the cuſtom obſerved in the antient chriſtian church of penitents expreſſing their humiliation at this time, by appearing in ſack-cloth and aſhes. The want of this diſcipline is at preſent ſupplied, by reading publicly on aſh-wedneſday the curſes denounced in ſcripture againſt the ſeveral ſorts of ſins, the people repeating after each curſe, Amen.

WEED, a common name for all rank and wild herbs, that grow of themſelves, to the detriment of other uſeful herbs they grow among.

WEED, in the miners-language, denotes the degeneracy of a load or vein of fine metal into an uſeleſs marcaſite.

WEEK, *ſeptimana*, *hebdomada*, in chronology, a diviſion of time compriſing ſeven days.

The origin of this diviſion of weeks, or of computing time by ſevenths, is greatly controverted. Some will have it to take its riſe from the four quarters or intervals of the moon, between her changes or phaſes, which, being about ſeven days diſtant, gave occaſion to the diviſion.

Be this as it will, the diviſion is certainly very antient. The Syrians, Egyptians, and moſt of the oriental nations, appear to have uſed it from all antiquity: though it did not get footing in the weſt till Chriſtianity brought it in: the Romans reckoned their days not by ſevenths but by ninths, and the antient Greeks by decads or tenths.

Indeed, the Jews divided their time by weeks, but it was upon a different principle from the eaſtern nations. God himſelf appointing them to work ſix days, and to reſt the ſabbath, in order to keep up the ſenſe and remembrance of the creation; which being effected in ſix days, he reſted the ſeventh.

*Paſſion* WEEK, or the *Holy* WEEK, is the laſt week in Lent, wherein the church celebrates the myſtery of our Saviour's death and paſſion.

WEEK, or WYCK, in geography, a parliament and port-town of Scotland, in the ſhire of Cathneſs: weſt long. 2° 45′, north lat. 58° 40′.

WEEN, or HUEN, a little iſland in the ſound, at the entrance into the Baltic, ſixteen miles north of Copenhagen.

WEEVER, in ichthyology, the trachinus with the lower jaw longeſt, and without beards. See TRACHINUS.

It grows to ſix or eight inches in length, and is thick in proportion: the head is large and compreſſed, the eyes ſtand near one another at the top of it; the iris is of a gold yellow, the body is compreſſed, the lateral line ſtraight; there is on each ſide at the opercula a large and robuſt ſpine; the tail is ſcarce at all forked; the firſt back fin has five prickly rays; the ſecond has thirty-one; the pectoral fins have each ſixteen rays, and the pinna ani has thirty-two.

WEIDEN, a town of Bavaria, ſituated on the river Nab, fifteen miles north of Amberg.

WEIGH, WAY, or WEY, *waga*, a weight of cheeſe, wool, *&c.* containing 256 pounds avoirdupoiſe. Of corn, the weigh contains forty buſhels; of barley or malt, ſix quarters. In ſome places, as Eſſex, the weigh of cheeſe is 300 pounds.

WEIGHER, an officer in divers cities appointed to weigh the commodities bought or ſold in a public balance.

WEIGHING, the act of examining a body in the balance to find its weight.

WEIGHING-CHAIR, a machine contrived, by Sanctorius, to determine the quantity of food taken at a meal, and to warn the feeder when he had his quantum.

WEIGHING-ANCHOR, is the drawing it out of the ground it had been caſt into, in order to ſet ſail, or quit a port, road, or the like.

WEIGHT, GRAVITY, *pondus*, in phyſics, a quality in natural bodies whereby they tend downwards, towards the center of the earth. Or, weight may be defined, in a leſs limited manner, to be a power inherent in all bodies whereby they tend to ſome common point, called the center of gravity; and that with a greater or leſs velocity, as they are more or leſs denſe, or as the medium they paſs thro' is more or leſs rare.

In the common uſe of language, weight and gravity are conſidered as one and the ſame thing. Some authors, however, make a difference between them; and hold gravity only to expreſs a niſus or endeavour to deſcend, but weight an actual deſcent. But there is room for a better diſtinction. In effect, one may conceive gravity to be the quality as inherent in the body; and weight the ſame quality, exerting itſelf either againſt an obſtacle, or otherwiſe. Hence, weight may be diſtinguiſhed, like gravity, into abſolute and ſpecific. See GRAVITY.

Sir Iſaac Newton demonſtrates, that the weights of all bodies, at equal diſtances from the center of the earth, are proportionable to the quantities of matter each contains. Whence it follows, that the weights of bodies have not any dependence on their forms, or textures; and that all ſpaces are not equally full of matter. Hence, alſo, it follows, that the weight of the ſame body is different, on the ſurface of different parts of the earth; by reaſon its figure is not a ſphere, but a ſpheroid. See the article EARTH.

WEIGHT, *pondus*, in mechanics, is any thing to be raiſed, ſuſtained, or moved by a machine, or any thing that in any manner reſiſts the motion to be produced.

WEIGHT, in commerce, denotes a body of a known weight, appointed to be put in the balance againſt other bodies, whoſe weight is required.

The ſecurity of commerce depending, in good meaſure, on the juſtneſs of weights, which are uſually of lead, iron, or braſs, moſt nations have taken care to prevent the falſification thereof, by ſtamping or marking them by proper officers, after being adjuſted by ſome original ſtandard. Thus, in England, the ſtandard of weights is kept in the exchequer, by a particular officer called the clerk of the market. See the article CLERK.

Weights may be diſtinguiſhed in to antient and modern, foreign and domeſtic.

*Antient* WEIGHTS, 1. Thoſe of the antient Jews, reduced to the Engliſh troy weights, will ſtand as in the following table:

| | | | | lb. | oz. | dwt. | gr. |
|---|---|---|---|---|---|---|---|
| Shekel | | | - | 00 | 00 | 09 | 01 |
| 60 | Maneh | | - | 02 | 03 | 06 | 10 |
| 3000 | 50 | Talent | - | 113 | 10 | 01 | 10 |

2. Gre-

2. Grecian and Roman weights, reduced to englifh troy weight, will ftand as in the following table:

| | | | | | | | | | | oz. | dwt. | gr. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lentes | | | | | | | | | | 00 | 00 | $\frac{85}{112}$ |
| 4 | Siliquæ | | | | | | | | | 00 | 00 | 03$\frac{1}{28}$ |
| 12 | 3 | Obolus | | | | | | | | 00 | 00 | 09$\frac{3}{28}$ |
| 24 | 6 | 2 | Scriptulum | | | | | | | 00 | 00 | 18$\frac{3}{14}$ |
| 72 | 18 | 6 | 3 | Drachma | | | | | | 00 | 00 | 06$\frac{9}{14}$ |
| 96 | 24 | 8 | 4 | 1$\frac{1}{3}$ | Sextula | | | | | 00 | 03 | 00$\frac{6}{7}$ |
| 144 | 36 | 12 | 6 | 2 | 1$\frac{1}{2}$ | Sicilicus | | | | 00 | 04 | 13$\frac{2}{7}$ |
| 192 | 48 | 16 | 8 | 2$\frac{2}{3}$ | 2 | 1$\frac{1}{3}$ | Duella | | | 00 | 06 | 01$\frac{5}{7}$ |
| 576 | 144 | 48 | 24 | 8 | 6 | 4 | 3 | Uncia | | 00 | 18 | 05$\frac{1}{7}$ |
| 6912 | 1728 | 576 | 288 | 96 | 72 | 48 | 36 | 12 | Libra | 10 | 18 | 13$\frac{5}{7}$ |

The roman ounces is the englifh avoirdupois ounce, which they divided into feven denarii, as well as eight drachms; and fince they reckoned their denarius equal to the attic drachm, this will make the attic weights one eighth heavier than the correfponding roman weights.

*Modern European* WEIGHTS. 1. Englifh weights: By the twenty-feventh chapter of Magna Charta, the weights all over England are to be the fame; but for different commodities, there are two different forts, *viz.* troy weight and avoirdupoife weight. The origin from which they are both raifed, is a grain of wheat gathered in the middle of the ear.

In troy weight, twenty-four of thefe grains make a penny-weight fterling; twenty penny-weights make one ounce; and twelve ounces one pound. See the article TROY.

By this weight we weigh gold, filver, jewels, grains, and liquors. The apothecaries alfo ufe the troy pound, ounce, and grain; but they differ from the reft in the intermediate divifions. They divide the ounce into eight drachms; the drachm into three fcruples, and the fcruple into twenty grains.

In avoirdupoife weight, the pound contains fixteen ounces, but the ounce is lefs by near one-twelfth than the troy ounce; this latter containing 490 grains, and the former only 448. The ounce contains 16 drachms. 80 ounces avoirdupoife are only equal to 73 ounces troy; and 17 pounds troy equal to 14 pounds avoirdupoife. See AVOIRDUPOISE.

By avoirdupoife weight are weighed mercury, and grocery wares, bafe metals, wool, tallow, hemp, drugs, bread, *&c.*

Table of Troy Weight as ufed by the

Goldfmiths.

| Grains | | | |
|---|---|---|---|
| 24 | Penny-weight. | | |
| 480 | 20 | Ounce. | |
| 5760 | 240 | 12 | Pound. |

Apothecaries.

| Grains. | | | | |
|---|---|---|---|---|
| 20 | Scruple. | | | |
| 60 | 3 | Drachm. | | |
| 480 | 24 | 8 | Ounce. | |
| 5760 | 288 | 96 | 12 | Pound. |

Table of Avoirdupoife Weight.

| Scruples. | | | | | |
|---|---|---|---|---|---|
| 3 | Drachm. | | | | |
| 24 | 8 | Ounce. | | | |
| 384 | 128 | 16 | Pound. | | |
| 43008 | 14336 | 1792 | 112 | Quintal, or Hundred | |
| 860160 | 286720 | 35840 | 2240 | 20 | Ton. |

The moneyers, jewellers, *&c.* have a particular clafs of weights, for gold and precious ftones, *viz.* carat and grain; and for filver, the penny-weight and grain. See the article CARACT.

The moneyers have alfo a peculiar fubdivifion of the grain troy: Thus,

| | | | |
|---|---|---|---|
| The | Grain | into | 20 Mites. |
| | Mite | | 24 Droits. |
| | Droit | | 20 Perits. |
| | Perit | | 24 Blanks. |

The dealers in wool have likewiſe a particular ſet of weights, *viz.* the ſack, weigh, tod, ſtone, and clove.

2. French weights: The common or Paris pound is 16 ounces; which they divide two ways: the firſt diviſion is into 2 marcs; the marc into 8 ounces; the ounce into 8 groſs; the gros into 3 penny-weights; the penny-weight into 24 grains; the grain equivalent to a grain of wheat. The ſecond diviſion of the pound is into 2 half-pounds; the half-pound into 2 quarters; the quarter into 2 half-quarters; the half-quarter into [illegible] ounces; and the ounce into two half-ounces.

The weights of the firſt diviſion are uſed to weigh gold, ſilver, and the richer commodities: and the weights of the ſecond diviſion, for commodities of leſs value.

| Grains. | | | | | |
|---|---|---|---|---|---|
| 24 | Penny-weight. | | | | |
| 72 | 3 | Gros. | | | |
| 576 | 24 | 8 | Ounce. | | |
| 4608 | 192 | 64 | 8 | Marc. | |
| 9216 | 384 | 128 | 16 | 2 | Pound. |

| Half-ounce. | | | | | | |
|---|---|---|---|---|---|---|
| 2 | Ounce. | | | | | |
| 4 | 2 | Half-quarter pound. | | | | |
| 8 | 4 | 2 | Quarter pound. | | | |
| 16 | 8 | 4 | 2 | Half-pound. | | |
| 32 | 16 | 8 | 4 | 2 | Pound. | |
| 3200 | 1600 | 800 | 400 | 200 | 100 | Quintal. |

But the pound is not the ſame throughout France. At Lyons, *e. gr.* the city pound is only 14 ounces: So that 100 Lyons pounds make only 88 Paris pounds. But beſide the city pound, they have another at Lyons for ſilk, containing 16 ounces. At Tholouſe, and throughout the Upper-Languedoc, the pound is 13 ounces and a half of Paris weight. At Marſeilles, and throughout Provence, the pound is 13 ounces of Paris weight. At Rouen, beſide the common Paris pound and marc, they have the weight of the vicomte; which is 16 ounces, a half, and five-ſixths of the Paris weight. The weights, enumerated under the two articles of engliſh and french weights, are the ſame that are uſed throughout the greateſt part of Europe; only under ſomewhat different names, diviſions and proportions.

Particular nations have alſo certain weights peculiar to themſelves: thus, Spain has its arrobas, containing 25 ſpaniſh pounds, or one-fourth of the common quintal: its quintal macho, containing 150 pounds, or one-half common quintal, or 6 arrobas: its adarme, containing one-ſixteenth of its ounce. And for gold, it has its caſtillan, or one-hundredth of a pound. Its tomin, containing 12 grains, or one-eighth of a caſtillan. The ſame are in uſe in the Spaniſh Weſt-Indies.

Portugal has its arroba, containing 32 Liſbon arratels, or pounds: Savary alſo mentions its faratelle, containing 2 Liſbon pounds: and its rottoli, containing about 12 pounds. And for gold, its chego, containing four carats. The ſame are uſed in the Portugueſe Eaſt-Indies.

Italy, and particularly Venice, have their migliaro, containing four mirres; the mirre containing 30 Venice pounds: The ſaggio, containing a ſixth part of an ounce. Genoa has five kinds of weights, *viz.* large weights, whereby all merchandizes are weighed at the cuſtom-houſe: caſh weights for piaſtres, and other ſpecies: the cantara, or quintal, for the coarſeſt commodities: the large balance for raw ſilks; and the ſmall balance for the finer commodities. Sicily has its rotollo, 32 and a half pounds of Meſſina.

Germany, Flanders, Holland, the Hanſe Towns, Sweden, Denmark, Poland, *&c.* have their ſchippondt, which at Antwerp and Hamburgh, is 300 pounds; at Lubeck, 320; and at Coningſberg, 400 pounds. In Sweden, the ſchippondt for copper is 320 pounds; and the ſchippondt for proviſions 400 pounds. At Riga and Revel, the ſchippondt is 400 pounds; at Dantzic, 340 pounds; in Norway, 300 pounds; at Amſterdam, 300; containing 20 lyſpondts, each weighing 15 pounds. In Muſcovy, they weigh their large commodities by the bercheroët, or berkewits, containing 400 of their pounds. They have alſo the poet, or poede, containing 40 pounds, or one-tenth of the bercheroët.

In order to ſhew the proportion of the ſeveral weights uſed throughout Europe, we ſhall add a reduction of them to one ſtandard, *viz.* the London and Amſterdam-pound.

1. Proportion of the weights of the principal places of Europe.

The

The 100 ℔. of England, Scotland, and Ireland are equal to

| ℔ | oz. | |
|---|---|---|
| 91 | 8 | of Amsterdam, Paris, &c. |
| 96 | 8 | of Antwerp or Brabant. |
| 88 | 0 | of Rouen, the viscounty weight. |
| 106 | 0 | of Lyons, the city weight. |
| 90 | 9 | of Rochelle. |
| 107 | 11 | of Toulouse and Upper Languedoc. |
| 113 | 0 | of Marseilles or Provence. |
| 81 | 7 | of Geneva. |
| 93 | 5 | of Hamburgh. |
| 89 | 7 | of Francfort, &c. |
| 96 | 1 | of Leipsic, &c. |
| 137 | 4 | of Genoa. |
| 132 | 11 | of Leghorn. |
| 153 | 11 | of Milan. |
| 152 | 0 | of Venice. |
| 154 | 10 | of Naples. |
| 97 | 0 | of Seville, Cadiz, &c. |
| 104 | 13 | of Portugal. |
| 96 | 5 | of Leige. |
| 112 | $\frac{2}{3}$ | of Russia. |
| 107 | $\frac{1}{24}$ | of Sweden. |
| 89 | $\frac{1}{2}$ | of Denmark. |

2. Proportion of the weights of the chief cities in Europe, to those of Amsterdam. An 100 pounds of Amsterdam are equal to

| ℔ | |
|---|---|
| 108 | of Alicant. |
| 105 | of Antwerp. |
| 120 | of Archangel, or 3 poedes. |
| 105 | of Arschot. |
| 120 | of Avignon. |
| 98 | of Basil in Switzerland. |
| 100 | of Bayonne in France. |
| 166 | of Bergamo. |
| 97 | of Bergen-op-zom. |
| 95 $\frac{1}{4}$ | of Bergen in Norway. |
| 111 | of Bern. |
| 100 | of Basançon. |
| 100 | of Bilboa. |
| 105 | of Bois le duc. |
| 151 | of Bologna. |
| 100 | of Bourdeaux. |
| 104 | of Bourgen Bresse. |
| 103 | of Bremen. |
| 125 | of Breslaw. |
| 105 | of Bruges. |
| 105 | of Brussels. |
| 105 | of Cadiz. |
| 105 | of Cologne. |
| 125 | of Coningsberg. |
| 107 $\frac{1}{2}$ | of Copenhagen. |
| 87 | rottos of Constantinople. |
| 113 $\frac{1}{2}$ | of Dantzic. |
| 100 | of Dort. |
| 97 | of Dublin. |
| 97 | of Edinburgh. |
| 143 | of Florence. |
| 98 | of Francfort on the Maine. |
| 105 | of Gaunt. |
| 89 | of Geneva. |
| 163 | of Genoa, cash weight. |
| 102 | of Hamburgh. |
| 106 | of Leyden. |
| 105 | of Leipsic. |
| 105 $\frac{1}{2}$ | of Liege. |
| 114 | of Lisle. |
| 143 | of Leghorn. |
| 106 $\frac{1}{2}$ | of Lisbon. |
| 109 | of London, avordupoise weight. |
| 105 | of Lovaine. |
| 105 | of Lubec. |
| 141 $\frac{2}{3}$ | of Lucca, light weight. |
| 116 | of Lyons, city weight. |
| 114 | of Madrid. |
| 105 | of Marlines. |
| 123 $\frac{1}{2}$ | of Marseilles. |
| 154 | of Messina, light weight. |
| 168 | of Milan. |
| 120 | of Montpelier. |
| 125 | bercheroets of Muscovy. |
| 100 | of Nantes. |
| 106 | of Nancy. |
| 169 | of Naples. |
| 98 | of Nuremberg. |
| 100 | of Paris. |
| 112 $\frac{1}{2}$ | of Revel. |
| 109 | of Riga. |
| 100 | of Rochelle. |
| 146 | of Rome. |
| 100 | of Rotterdam. |
| 96 | of Rouen, viscounty weight. |
| 100 | of St. Malo. |
| 100 | of St. Sebastian. |
| 158 $\frac{1}{2}$ | of Saragosa. |
| 106 | of Seville. |
| 114 | of Smyrna. |
| 110 | of Stetin. |
| 81 | of Tholouse and Upper Languedoc. |
| 151 | of Turin. |
| 158 $\frac{1}{2}$ | of Valencia. |
| 182 | of Venice, small weight. |

WEIGHTS, *used in the several parts of Asia, the East-Indies, China, Persia*, &c. In Turky, at Smyrna, &c. they use the batman, or battemant, containing six occos; the occo weighing three pounds four-fifths English. They have another batman much less, consisting as the former, of six occos: but the occo only containing fifteen ounces english: 44 occos of the first kind make the turkish quintal. At Cairo, Alexandretta, Aleppo, and Alexandria, they use the rotto, rotton, or rottoli. The rottoli at Cairo, and other parts

parts of Egypt, is 144 drachms; being ſomewhat over an engliſh pound. At Aleppo there are three ſorts of rottos; the firſt 720 drachms, making about ſeven pounds engliſh, and ſerving to weigh cottons, galls, and other large commodities: the ſecond is 624 drachms, uſed for all ſilks but white ones, which are weighed by the third rotto of 700 drachms. At Seyda the rotto is 600 drachms.

The other ports of the Levant, not named here, uſe ſome of theſe weights; particularly the occo, or ocqua, the rottoli, and rotto.

The chineſe weights are the piece, for large commodities; it is divided into 100 catis, or cattis; tho' ſome ſay into 125; the cati into 16 taels, or tales; each tael equivalent to 1 $\frac{1}{3}$ of an ounce engliſh, or the weight of one rial and $\frac{1}{12}$, and containing twelve mas, or maſſes, and each mas 10 condrins. So that the Chineſe piece amounts to 137 pounds engliſh avoirdupois, and the cadi to 1 pound 8 ounces. The picol for ſilk containing 66 catis and $\frac{2}{3}$, the bahar, bakaire, or barr, containing 300 catis.

Tonquin has alſo the ſame weights, meaſures, &c. as China. Japan has only one weight, *viz.* the cati; which, however, is different from that of China, as containing 20 taels. At Surat, Agra, and throughout the ſtates of the great mogul, they uſe the man, or maund, whereof they have two kinds; the king's man, or king's weight; and the man ſimply; the firſt uſed for the weighing of common proviſions, containing 40 ſeers, or ſerres; and each ſeer a juſt Paris pound. The common man, uſed in the weighing of merchandize, conſiſts likewiſe of 40 ſeers, but each ſeer is only eſtimated at 12 Paris ounces, or $\frac{3}{4}$ of the other ſeer.

The man may be looked on as the common weight of the Eaſt-Indies, though under ſome difference of name, or rather of pronunciation; it being called mao at Cambaya, and in other places mein, and maun. The ſeer is properly the indian pound, and of univerſal uſe; the like may be ſaid of the bahar, tael, and catti above-mentioned.

The weights of Siam, are the piece containing two ſhans, or cattis; but the Siameſe catti is only half the Japoneſe, the latter containing 20 taels, and the former only 10; though ſome make the Chineſe catti only 16 taels, and the Siameſe 8. The tael contains 4 baats or ticals; each about a Paris ounce; the baat 4 ſelings, or mayons; the mayon 2 fouangs; the fouang 4 payes; the paye 2 clams; the ſompaye half a fouang.

It is to be obſerved, that thoſe are the names of their coins as well as weights; ſilver and gold being commodities there ſold, as other things, by their weights.

In the iſle of Java, and particularly at Bantam, they uſe the gantan, which amounts to near three dutch pounds. In Golconda, at Viſapour, and Goa, they have the furatelle containing 1 pound 14 ounces engliſh; the mangalis or mangelin for weighing diamonds and precious ſtones, weighing at Goa 5 grains, at Golconda, &c. 5 $\frac{1}{2}$ grains. They have alſo the rotolo containing 14 $\frac{1}{4}$ ounces Engliſh; the metricol containing the ſixth part of an ounce; the wall for piaſters and ducats, containing the 73d part of a rial.

In Perſia they uſe two kinds of batmans or mans, the one called cahi or cheray, which is the king's weight; and the other batman of Tauris. The firſt weighs 13 pounds 10 ounces engliſh; the ſecond, 6 pounds $\frac{1}{2}$. Its diviſions are the ratel, or a 16th; the derhem or drachm, which is the 50th; the meſchal, which is half the derhem; the dung, which is the 6th part of the meſchal, being equivalent to ſix carat-grains; and, laſtly, the grain which is the fourth part of the dung. They have alſo the vakie, which exceeds a little our ounce; the ſah-cheray, equal to the 1170th part of the derhem; and the toman uſed to weigh our large payments of money, without telling; its weight is that of 50 abaſſis.

African and American weights. We have little to ſay as to the weights of America: the ſeveral european colonies there making uſe of the weights of the ſtates or kingdoms of Europe they belong to. For, as to the aroue of Peru, which weighs 27 pounds, it is evidently no other than the ſpaniſh arroba with a little difference in the name.

As to the weights of Africa, there are few places that have any, except Egypt, and the countries bordering on the Mediterranean; whoſe weights have been already enumerated among thoſe of the ports of the Levant. The iſland of Madagaſcar indeed has weights, but none that exceed the drachm, nor are they uſed for any thing but gold and ſilver.

WEIGHT *of the air*. See AIR.

WEIL, or WEYL, an imperial city of Ger-

Germany, in the circle of Swabia, and dutchy of Wirtemburg: eaft long 8° 40′, north lat. 48° 40′.

WEILBURG, a town of Germany, in the territory of Weteravia, and county of Naffa, 26 miles north of Francfort.

WEIMAR, a city of Germany, in the circle of Upper Saxony, the capital of the dutchy of Weimar: eaft long. 11° 25′, north lat. 51°.

WEINGARTEN, a town of Germany, in the palatinate of the Rhine, twenty-five miles fouth-weft of Heidelburg.

WEINHEIM, a town of Germany, in the palatinate of the Rhine, ten miles north of Heidelburg.

WEISCHELMUNDE, or MUNDE, a fort of polifh Pruffia, at the mouth of the Viftula, which defends the harbour of Dantzick.

WEISEL, a river of Poland, and the fame with the Viftula. See VISTULA.

WEISSENBURG, or CROWNWEISSENBURG, a town of Germany, in the circle of the Upper Rhine, and Landgravate of Alface, twenty miles fouth-weft of Philipfburg.

WEISSENBURG, or STULWEISSENBURG, a city of Lower Hungary, fituated near the eaft end of the Platten fea, thirty-fix miles fouth-weft of Buda.

WEISSENBURG, a town of Tranfilvania, thirty miles weft of Hermanftat.

WEISSENBURG, a town of Germany, in the circle of Franconia, twenty miles north-weft of Ingolftat.

WEISSENFELD, a town of Germany, in the circle of Upper Saxony, and marquifate of Mifnia, feventeen miles fouth-weft of Leipfick.

WELCHPOLE, a market-town of Montgomeryfhire, fituated fix miles north of Montgomery.

WELD, or WOLD, *leuteola*, in botany, the fame with the refeda of Linnæus. See the article RESEDA.

WELDING HEAT, in fmithery, a degree of heat given to iron, *&c.* fufficient only for bending, or doubling it up. See the articles FORGING and HEAT.

WELL, a hole under ground, ufually of a cylindrical figure, and walled with ftone and mortar: its ufe is to collect the water of the ftrata around it.

WELL, in the military art, a depth which the miner finks under ground, with branches or galleries running out from it; either to prepare a mine, or to difcover and difappoint the enemy's mine.

WELL-HOLE, in building, is the hole left in a floor for the ftairs to come up through. See the article STAIRS.

WELLS, a city of Somerfetfhire, fituated fixteen miles fouth-weft of the city of Bath, both which cities have but one bifhop.

This is alfo the name of a town of Germany, in the circle of Auftria, fituated eleven miles fouth of Lintz.

WELLAND, a river which rifing in Leicefterfhire, and running eaftward between the counties of Rutland and Northampton, and afterwards north-eaft by Stamford, falls into a bay of the German Sea, which divides the counties of Lincoln and Norfolk.

WELLINGBOROUGH, a market-town of Northamptonfhire, fituated on the river Nen, ten miles north-eaft of Northampton.

WELLINGTON, a market-town of Shropfhire, fituated ten miles eaft of Shrewfbury.

WEM, a market-town of Shropfhire, fituated eight miles north of Shrewfbury.

WEN, a tumour or excrefcence that arifes on different parts of the body, and contains a cyftus, or bag filled with fome peculiar matter, of which phyficians reckon three kinds, *viz.* when this matter is foft, refembling pulp, the wen is called atheroma; if like honey, meliceris; and if like fuet, fteatoma. See the articles TUMOUR, ATHEROMA, *&c.*

WENDOVER, a borough-town of Bucks, fix miles fouth of Ailefbury; which fends two members to parliament.

WENER, a lake in Sweden, in the province of Gothland, feventy miles in length, and fifty in breadth.

WENLOCK, a borough-town of Shropfhire, ten miles fouth-eaft of Shrewfbury; which fends two members to parliament.

WENSUSSEL, the north divifion of Jutland, in Denmark, having the Categate-Sea on the north; the Schaggerrack fea, on the eaft; the province of Wiburg on the fouth; and the German Sea on the weft.

WEOBLEY, a borough-town of Herefordfhire; 12 miles north-weft of Hereford; which fends two members to parliament.

WERCHTEREN, a town of the auftrian Netherlands, in the province of Brabant, nine miles eaft of Mechlin.

WERDEN, a town of Germany in the circle of Weftphalia, ten miles north-eaft of Duffeldorp.

WERE, in our old law-books, denotes a fum paid for killing a perfon, when fuch crimes were punifhed with pecuniary mulcts, and not death.

WERELADA, among our saxon ancestors, the denying an homicide on oath, in order to be quit of the fine called WERE.

WERGILD, or WEREGELD, in our antient customs, the price of a man's head, a part of which was paid to the king, for the loss of his subject, a part to the lord whose vassal he was, and a part to the nearest relation of the person slain.

WERMELAND, a province of Sweden, lying between the province of Dalecarlia, on the north, and the lake Wener on the south.

WESEL, a city of Germany, in the dutchy of Cleves: east long. 6° 5′, north lat. 51° 37′.

WEISEL, a river of Poland, also called the Vistula. See the article VISTULA.

WESER, a river of Germany, which rises in the Landgravate of Hesse, runs between the circles of Westphalia and Lower Saxony, and falls into the German Sea below Carlstat.

WEST, in cosmography, one of the cardinal points of the horizon, diametrically opposite to the east; and strictly defined, the intersection of the prime vertical with the horizon, on that side the sun sets in. See HORIZON, *&c.*

In astronomy, west is chiefly used for the place in, or towards which, the sun or stars sink under the horizon. Thus we say, the sun, mars, *&c.* are in the west. The point the sun sets in, when in the equator, is particularly called, the equinoctial west, or point of true west. See the article EQUINOCTIAL.

In geography, west and western, are applied to several countries, *&c.* situate towards the point of sun-setting, with respect to certain others. Thus the roman empire was antiently, and the german empire is at present, called the empire of the west, or the western empire, in opposition to that of Constantinople, which is called the eastern empire. The roman church is called the western church, in opposition to the greek church. The Italians, French, Spaniards, *&c.* are called western nations, in respect to the Asiatics; and part of America, the West-Indies, in respect to the East-Indies.

WESTBURY, a borough-town of Wiltshire, twenty miles north-west of Salisbury; which sends two members to parliament.

WESTERN ISLES. See the articles AZORES and HEBRIDES.

WESTLOW, a borough-town of Cornwal, twenty-three miles south-west of Launceston; which sends two members to parliament.

WESTMANIA, a province of Sweden, having Upland on the east, and Wermeland on the west.

WESTMEATH, a county of Ireland, in the province of Leinster, bounded by Longford and Cavan on the north; by Eastmeath, on the east; by King's County, on the south; and by the river Shannon, which divides it from Roscommon, on the west.

WESTMINSTER, a city which forms the west part of the town which goes by the general name of London; but is under a distinct government; the dean and chapter appointing the high steward, high bailiff, and other officers, who have the government of the city. Here are the king's palaces, and the houses of most of the nobility, the high court of parliament, and the supreme courts of justice; but there is no bishop of this city. It elects two members of parliament. See the article LONDON.

WESTMORELAND, an english county bounded by Cumberland, on the north; by Yorkshire on the east; by Lancashire, on the south; and by the Irish channel on the west.

WESTPHALIA, the north-west circle of the empire of Germany, bounded by the german ocean, on the north; by the circle of Lower Saxony, on the east; by the Landgravate of Hesse, the Palatinate of the Rhine, and the electorate of Triers, on the south; and by the Netherlands on the west; being 200 miles in length, and from 150 to 200 in breadth.

WESTRAM, a market-town of Kent, under the meridian of London, 44 miles west of Canterbury.

WETER, a swedish Lake, in the province of Gothland, ninety miles long.

WETTERAVIA, or WETTERAW, the southern division of the Landgravate of Hesse, in Germany, lying along the northern bank of the river Maine, comprehending the counties of Hanau and Nassau.

WETZLAR, an imperial city of Germany, in the circle of the Upper Rhine and territory of Wetteravia, situated on the river Lohn, east long. 8° 15′, north lat. 50° 30′.

WEXFORD, a county of Ireland, in the province of Munster, bounded by the county of Wicklow, on the north; by the ocean on the east and south; and by Kilkenny and Waterford on the west.

Wexford, the capital of this county, is ſituated at the mouth of the river Slaney, ſixty-five miles ſouth of Dublin.

WEYMOUTH, a port-town of Dorſetſhire, ſituated on a fine bay of the engliſh channel, ſeven miles ſouth of Dorcheſter. It ſends two members to parliament.

WHALE, *balæna*, in ichthyology. See the article BALÆNA.

The balæna, with the fiſtula, in the middle of the head, and the back ridged toward the tail, is the fiſh determinately and properly called the whale, though the phyſeter, as well that with the upper jaw longeſt, and with a long ſpine on the back, as that with the back-fin very tall, and the ſummit of the teeth plane, is the former called the crooked toothed whale, and the latter the plane toothed whale; as is alſo that phyſeter which is a ſpecies of the balæna. See PHYSETER.

The balæna, or the whale properly ſo called, grows to a monſtrous ſize; the head is extremely large, and of an irregular figure, the lower jaw is much larger than the upper, and covers it at the ſides; the upper, is narrow and oblong, the fiſtula is double, or has two diſtinct apertures, and is ſituated in the middle of the head, between the eyes; the eyes are very ſmall in proportion to the enormous bulk of the head, and are placed a great diſtance from one another; the whole head is ſomewhat depreſſed, and has ſeveral irregularities on its ſurface; the body is very thick, and ſomewhat rounded, but towards the extremity of the back, there is a ſubacute angle, extending itſelf longitudinally to the tail; the tail is ſomewhat forked, very large, and in its horizontal ſituation makes a very ſingular figure. This is an inhabitant of the moſt northern ſeas, the principal object of the Greenland fiſhery, and the firſt known ſpecies.

For the manner of fiſhing for the whale, ſee the article FISHERY.

WHALE-BONE, or as it is otherwiſe called, whale-fins, in commerce, a commodity procured from the whale, uſed as ſtiffening in ſtays, fans, buſks, ſkreens, *&c.* What we call whale-bone, or fins, is a horny laminæ in the upper jaw of the balæna, which ſupply the place of teeth, but there are none ſuch in the lower jaw. Theſe laminæ are commonly called whiſkers, which, ſplit and faſhioned, are the whale-bone. The pizzle, or genital member of the animal ſerves likewiſe for the ſame purpoſe. Whale-bone cut, is prohibited to be imported.

Whale-fins of Newfoundland, or any of the britiſh-colonies, or plantations, caught and imported in ſhips belonging to Great Britain, pay the pound, on importation, $2\frac{81\frac{1}{4}}{100}$d. and draw back, on exportation, $2\frac{81\frac{1}{4}}{100}$d. Whale-fins of any of the britiſh-colonies, caught in ſhips belonging to thoſe parts, but imported in ſhips belonging to Great Britain, pay the ton on importation, 28 l. 13 s. 9 d. and on exportation, draw back 28 l. 1 s. $10\frac{50}{100}$d. Whale-fins of any of the britiſh-colonies, caught and imported in ſhips belonging to thoſe parts, pay the ton, on importation, 31 l. 2 s. 6 d. and on exportation, draw back 29 l. 18 s. 9 d. Whale-fins of foreign fiſhing, the ton, pay on importation, 97 l. 2 s. and on exportation, draw back 88 l. 11 s. For the whale-fins, train-oil, and blubber of whales caught in the Greenland-ſeas, or St. David's Straights, or any parts of the ſeas adjoining, *&c.* See OIL.

WHARF, a ſpace on the banks of a haven, creek, or hithe, provided for the convenient loading and unloading of veſſels upon. See HAVEN, HITHE, *&c.*

The fee paid for the landing of goods on a wharf, or for ſhipping them off, is called wharfage, and the perſon who has the direction and overſight of the wharf, receives wharfage, *&c.* is called the wharfinger. See the article KEY.

WHEAT, *triticum*, in botany. See the article TRITICUM.

It has been very juſtly obſerved by the antients, as well as moderns, that wheat will grow in almoſt any part of the world, and that, as it is the plant moſt neceſſary to mankind, ſo it is the moſt general and the moſt fruitful. It grows well not only in the temperate climates, but in the very hot and very cold ones; and when ſown in places where it never grew ſpontaneouſly, ſucceeds as well as where it has been always common.

Mr. Tull obſerves, that when wheat is planted early, leſs ſeed is required to an acre than when it is planted late, becauſe leſs of it will die; and poor land ſhould always be allowed more ſeed than rich, becauſe a greater number of the plants will periſh on this land than on the other. The leaſt quantity yet of ſeed

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is neceffary for rich land, that is planted early: for in this cafe very few of the feeds will fail to produce a plant that will live and flourifh. The ufe of the hoe caufes every plant to fend out a great number of ftalks from the fame root; and in thefe, more than in the number of plants, confifts the richnefs of a crop, as the ears on thefe are always largeft and fulleft. See HOEING and HUSBANDRY.

Another thing to be confidered, in order to find the proper quantity of feed to plant, is, that fome wheat of the fame fpecies has its grains twice as large as others: in this cafe, a bufhel containing but half the number of grains that it does in the fmall grained-wheat, one bufhel of the fmall-grained will plant juft as much as two bufhels of this; not the meafure of the feeds, but the number of the grains being the thing to be confidered in regard to the fowing.

It is a very natural thing to fuppofe that a large-grained wheat will produce larger and finer plants, and larger grain than a fmall-grained one; but experiments have proved, that there is nothing in this; for the fmalleft-grained wheat produces fully as large plants as the largeft, and thofe with as great ears, and as big feeds; but the young plants appear fmaller and poorer. Six gallons of middle-fized feed is the ufual quantity drilled upon an acre; but on rich lands, planted early, four gallons will fuffice; becaufe then the wheat will have roots at the top of the ground before winter, and tiller very much, without danger of the worms, and many other accidents, which the late planted wheat is liable to. If it be drilled too thin, it will be in danger of falling, and if too thick, it may happen to tiller fo late in the fpring, that fome of the ears may be blighted; a medium therefore is beft. See the article DRILLING.

The depth to plant it at, is from half an inch to three inches; for if planted too deep, there is more danger of its being eaten off by worms between the grain and the blade. A wheat-plant that was not fown early, fends out no root above the grain, before the fpring, and is nourifhed all the winter by a fingle thread, proceeding from the grain up to the furface of the ground: this is the thread of life to the plant during the winter, and the longer that is, the greater danger there is of the worm, that creature much more eafily finding a thread that extends by its length to five or fix inches deep, than one which reaches but one inch; befide, the worms in winter do not inhabit very near the furface of the ground, and therefore they never naturally come in the way of the fhort threads, though the long ones are always in their reach.

It is very neceffary to take care againft the rooks, juft at the time when the wheat is fhooting up. Thefe mifchievous birds perceiving it beginning to fprout, before the farmer can fee any thing of it, and are led by the fhoot to pick it up; they muft be carefully kept off the ground for a week or ten days at this feafon; for at the end of that time the blade will be grown up, and the grain fo exhaufted of its flour, that it will be of no value to them, nor will they give themfelves any trouble about ftealing it.

There are four ways of augmenting the crops of wheat not only in the number of the plants, but in the ftalks, ears, and grains. The firft is by increafing the number of ftalks from one, two or three, to thirty or forty in each plant, in ordinary field land; and the crop is augmented by bringing up all thefe ftalks into ear, which is the fecond way; for if it be diligently obferved, it will be found that not one half of the ftalks of wheat, fown in the common way, ever come to ear at all: nay, if a fquare yard of fown-wheat be marked out, and the ftalks thereon numbered in the fpring, it will be found that no lefs than nine parts in ten of them are wanting at the harveft-time.

An experiment of the advantage of this augmentation was made by Mr. Tull in rows of wheat that were equally poor; one of thefe rows was increafed fo much, as to produce more grains than ten of the other, by bringing up more of its ftalks into ears; and alfo by augmenting the ears to a much greater bignefs, which is the third way: for it is very certain that the ears will be much larger or much fmaller, according to the quantity of nourifhment that is given them.

The fourth and laft way of increafing the crops of wheat is by caufing the grain to be much larger in the ears. This can no way be done fo effectually as by late hoeing, efpecially if it be done juft after the wheat is gone out of the bloffom; by this means the grains will weigh twice as much as thofe produced in the

fame

ſame ſort of wheat, when this late hoeing has been omitted; their number, at the ſame time, is the ſame in the ear; and as the wheat is ſold not by tale, but by meaſure, the farmer's gain is double in this caſe; the wheat meaſuring juſt twice as much as it would otherwiſe have done.

Thus, by increaſing the number of the ſtalks, bringing more of them up into the ear, making the ears larger, and the grains larger, plumper, and fuller in every ear; the method of horſe-hoeing, by which alone this can be effected, makes a larger crop out of the tenth part of the number of plants, than in the common way: but all theſe advantages will be loſt by thoſe who, though they give into the horſe-hoeing-way, yet will not allow the ſix feet intervals between the rows; for it is owing to this great ſpace of ground alone, that as much nouriſhment may be given to the wheat as the farmer pleaſes.

Poor light land, in the common way of huſbandry, muſt be extremely well manured, in order to the maintaining wheat a year, which is the uſual time that it is in it; and if it be ſown late, the greater part of it uſually periſhes, not being able to ſurvive the winter while ſo poor, and on ſuch land; and if it be ſown very early on ſtrong land, though rich, well tilled, and dunged, the crop will be worſe than on poor light land ſown early. The new method of horſe-hoeing gives both to ſtrong and to light land all the advantages neceſſary, and takes off all the diſadvantages of both. By this method the ſtrong land may be planted with wheat as early as the light, if plowed dry; and the hoe-plough, if rightly applied, will be able to give it nouriſhment equal to that of dung in both ſorts of land.

The tops of the ridges for the drilling of wheat muſt not be left quite ſo narrow and ſharp as they are for drilling of turneps; wheat being generally to be ſowed in treble rows, and the turnep only in ſingle ones. In reaping the wheat thus ſown, it is to be cut as near to the ground as poſſible, and this is eaſier done in this than in wheat ſown in the common way, becauſe in this drilled method the ſtalks all ſtand cloſe together. When the wheat is cut thus low in the reaping, the ſtubble is no great impediment to the preparing the land for the ſucceeding crops.

As ſoon as conveniently may be, after the carrying off a crop of wheat, if the trench in the middle of each wide interval be left deep enough by the laſt hoeing, the farmer is to go as near as he can to the ſtubble with a common plough, and turn two large furrows into the middle of the intervals which will make a ridge over the place where the trench was; but if the trench be not deep enough, it is beſt to go firſt in the middle of it with one furrow; this, with two more taken from the ridges, will be three furrows, in each interval; this plowing is to be continued as long as the dry weather laſts, and then the whole is to be finiſhed by turning the partitions on which the laſt wheat grew up to the new ridges, which is uſually done at two great furrows; theſe laſt furrows, which complete the ridges, may be plowed in wet weather. By this ſort of management, the wheat being planted in rows, at ſix feet intervals, the ſame piece of ground will produce every year a new crop of wheat in the intervals, without any fallowing or manure, only by means of the ſufficiently breaking the ſurface with plowing and horſe-hoeing.

*Buck* WHEAT. This is a plant very advantageous to the farmers of England, who have barren lands in poſſeſſion. It is to be ſown in May. One buſhel of ſeed will ſow an acre, and it will grow on any ſoil. It ripens late in autumn, and, when mowed, it muſt lie upon the ground till the ſtalks, which are naturally hard, grow ſoft; it will not ſhed the ſeed in lying, nor will it get any damage by the rain. It yields a very conſiderable increaſe, and if the land be tolerable, ſometimes no leſs than fifty or ſixty buſhels from an acre.

It is excellent food for hogs, poultry, and other animals. The flour of it is very white, and, mixed with wheat-flour, is uſed for food by the country people in ſome places. The ſtraw is good fodder for cattle, and the grain is good to give to horſes among their oats; but it muſt be broken in a mill, otherwiſe it will paſs through them whole.

*White-Cone-*WHEAT, a term uſed by our huſbandmen to expreſs a peculiar kind of wheat, which is very ſtrong, and has a large ear.

It is the beſt kind for ſowing in fields ſubject to the blight; for the ſtalks of it being, for the moſt part ſolid or full of pith

pith like a rufh, not hollow like thofe of common wheat; the infects that caufe the blight feizing on the ftalks of other wheat, does this no injury, even though they fhould attack it; the ftalks of this kind being often found full of black fpecks, which are always the marks of that infect having been there, and yet the ear full, and the grain good.

This wheat makes very good bread, if the miller does not grind it too fmall, or the baker make his dough too hard; it requiring to be fomewhat larger than other wheat-flour, and fomewhat fofter in the dough. A bufhel of white-cone-wheat will make confiderably more bread than a bufhel of lammas-wheat; but it gives it fomewhat a yellowifh caft.

*Smyrna*-WHEAT, a peculiar kind of wheat that has an extremely large ear, with many leffer or collateral ears coming all round the bottom of the great one.

As this is the largeft of all forts of wheat, fo it will difpenfe with the nourifhment of a garden, without being overfed, and requires more nourifhment than common hufbandry in the large way can give it. In the common way its ears grow not much larger than thofe of our common wheat.

This fort of wheat feems, of all others, the moft proper for the new method of horfe-hoeing hufbandry, as that method feems capable of giving as much nourifhment as the farmer pleafes, by often repeating the hoeing. Next to this, the white-cone-wheat is beft for this fort of hufbandry; then the grey-cone-wheat.

WHEAT, a common article of our food, is more glutinous and nutritious than moft other kinds of grain. The flour, or the ftarch, prepared from it, form with water a foft vifcid fubftance, which has been taken with good fuccefs in diarrhœas and dyfenteries. Bran contains, befides the hufks or fhells of the wheat, a portion of farinaceous matter: this is lefs glutinous than the finer flour, and is fuppofed to have a detergent quality. See BRAN.

For the bounties upon wheat, fee CORN.

For the manner of preferving wheat, fee the articles CORN and GRANARY.

For the manner of grinding, &c. wheat, fee GRINDING, MILL, FLOUR, &c.

WHEAT-EAR, in ornithology, the englifh name of a fpecies of motacilla, with a grey, black, and white forehead. See the article MOTACILLA.

WHEEL, *rota*, in mechanics, a fimple machine, confifting of a round piece of wood, metal, or other matter, which revolves on an axis. The wheel is one of the principal mechanic powers: it has place in moft engines; in effect, it is of an affemblage of wheels that moft of our engines are compofed. For the theory of this mechanic power, called axis and wheel, fee AXIS *in peritrochio*.

For the theory of clock-wheels, watch-wheels, mill-weels, &c. fee the articles CLOCK, MILL, &c.

With regard to the wheels of coaches, waggons, &c. otherwife called wheel-carriages, the whole doctrine thereof may be reduced to the following particulars; *viz.* 1. Wheel-carriages meet with lefs refiftance than any other. 2. The larger the wheel the eafier is the draught of the carriage. 3. A carriage upon four wheels of equal fize, is drawn with lefs force than with two of thofe wheels and two of a leffer fize. 4. If the load be laid on the axle of the larger wheels, it will be drawn with lefs force than if it had laid on the axis of the leffer wheels, contrary to the common notion of loading carriages before. 5. The carriage goes with much lefs force on friction-wheels than in the common way: all which will be confirmed by experiments. The wheels of carriages muft be exactly round, and the fellies fhould be at right angles to the naves, according to the inclination of the fpokes: that is, the plane of the curvature of the wheel fhould cut the nave at right angles, though it need not pafs through the fpace where the fpokes are inferted into the nave.

1. It is a general rule in all cafes that the wheels be exactly round; for if they were not fo, but like E F G H (plate CCC. fig. 1.) and the nave out of the center, it is certain, that fuch a wheel in turning, would be affected in the fame manner upon plane ground as other wheels are when they rife and fall, and would not be in equilibrio; the wheel turning towards H would move with as much difficulty as if there was a rife to afcend; and that height being paffed, it would fall on a fudden, as if a fquare ftone was rolled along, and the jolts of the wheel would precipitate and pufh the horfes at one time, and immediately increafe their difficulty of drawing the next moment, and that in proportion to the wheels being out of round: yet

yet if the nave ſhould not be in the middle, the ſhorteſt part, as F, being on the ground; when ſuch a wheel begins to turn, the weight muſt be raiſed in the ſame manner as when another carriage is going up an hill: and from F to D, or quite to G, the wheel would act like a wedge: and at D, or G, it would fall and drive on the horſes as in a ſteep deſcent.

2. The fellies muſt not croſs wind, but be at right angles with the naves, according to the inclination of the ſpokes; for otherwiſe the wheel in turning would find inequalities, as it happens when the hole of the nave is too big, and the wheel moves from ſide to ſide; which comes to the ſame purpoſe as if the wheel was out of round; and then the inequality of the ſpokes, which would be too leaning or too ſtrait, upon the nave deſcending into an hole, or riſing upon an eminence, oppoſite to their inclination would cauſe them, or the fellies, to break.

3. The ſpokes muſt be inclined to the naves, that the wheels may be diſhing or concave. If the wheels always turned upon ſmooth and even ground, it is certain that the ſpokes ought to be ſtraight upon the naves; that is, at right angles to their axes, becauſe then they would bear perpendicularly, like the ſpoke B, (*ibid.* fig. 2.) of the nave A C, which is the ſtrongeſt way for wood. But becauſe the ground is unequal, and when the wheels fall into the ruts, that wheel which is in the rut bears a greater part of the weight than the other, becauſe it is lower: in ſuch a caſe the ſpokes of a diſhing wheel become perpendicular in the rut, and therefore have the greateſt ſtrength; whilſt the oppoſite wheel, being upon higher ground, bears a leſs part of the weight; and, conſequently, the ſpokes need not be at their full ſtrength, and ſo will have a ſufficient force, though that force be leſs than what they have upon even ground.

4. The axle-tree muſt be ſtraight in all reſpects, and at right angles to the ſhafts or to the pole. In the motion of all bodies there is one way of moving which is the eaſieſt of all the reſt, and happens here when the axle-tree is every way ſtraight; for if its ends ſhould bend backwards, ſo as to bring the wheels nearer together behind, as A E, *ibid.* fig. 3. and ſpread them much before, as D C, it is certain that they could not go into the ruts, nor turn in going forward, or at leaſt with great difficulty dragging inſtead of rolling. There would be the ſame inconveniences in bending the axle-tree forward, ſo as to bring them nearer the pole as I F, fig. 4. and make them ſpread behind, as at B D. The leſs the axle-tree is bent, the leſs the inconveniency: but there will always be ſome, when the wheels are not parallel; and there will be no inconveniency when the axle is ſtraight, and the wheels are in the ſituation C P and A D, fig. 5. The axle muſt alſo be at right angles to the pole or ſhaft; for if the pole or ſhafts were on one ſide, as at B, fig. 3. or C, fig. 4. the coach or carriage would be drawn on one ſide, and almoſt all the weight would bear upon one horſe; but it muſt be at right angles like the pole G, fig. 5.

5. Great wheels are always more advantageous for rolling than little ones, in any caſe, or upon any ground whatſoever. The wheels of carriages are conſidered according to the velocity and friction they have upon the axle-tree, and likewiſe according to their reſiſtance, or ſinking in upon the ground. If we conſider them according to the friction, it is certain, that a wheel whoſe diameter is double that of another, will make but one turn, whilſt the little one makes two for the ſame length of way; the circumference, which is in proportion to the diameter being double. Therefore, in reſpect to friction, a wheel of double the diameter will have a double advantage, there being but one turn inſtead of two, which doubles the friction in the ſmall wheel. The wheel A B C, being twice as big as the wheel D E F, (*ibid.* fig. 6 and 7.) will have twice the advantage in reſpect of the friction, the holes of the nave and the axles being equal. See the articles FRICTION, CIRCUMFERENCE, &c.

If we conſider the wheels according as they ſink into the earth, or fall into holes, there will be the ſame advantage for the one and inconveniency for the other. If we conſider the bearing, it is double in the great wheel; therefore it will ſink but half the way: and if we conſider hollows, it will give the ſame advantage in ſome caſes; but then in others, as, for example, where the holes are deep, the little wheel will have much more diſadvantage: for if it ſhould fall into a great hole, as DE, fig. 6, 7, and 8. of a diameter, equal to that of the wheel, it would wholly ſink in

whilst the great wheel would only fall in the depth of its segment AB, which would not be half the wheel, as may be seen from the parallel lines A D and B E. We may suppose the same to happen in marshy grounds, where a little wheel would sink wholly in the same hole that the great one would sink but in part. E F, *ibid.* fig. 8. is a cart, or carriage: B D a rub for the wheel C A D to pass over, AB the horizontal plane; DB, AC, perpendicular, and O D parallel, to A B, C the centre of the wheel. Then the horizontal force required to pull the wheel over the rub B D, is as $\frac{DO}{CO}$: and the difficulty of going over rubs increases in a greater ratio than that of their heights. Also the higher the wheels, the more easily they pass over them; but then they are the more apt to overturn.

To draw the cart with the least power over the rub B D, it should not be drawn in the horizontal direction AB or OD, but in the direction AD. The advantage then of high wheels is, that they pass the rubs most easily, have the less friction, sink less in the dirt, and more easily press down an obstacle: and their disadvantage is, that they easily overturn, and make cattle draw too high; for they can apply their strength best when they draw low and upwards in the direction A D, which is the advantage of low wheels: yet if the wheels are high they may be made to draw low, by fixing the limmers or traces as far below the axle as you will, which will then be an equal advantage with low wheels. For the power not pulling at the wheel, but at the carriage, may draw from any part of it. There is another advantage in small wheels, which is, that they are better to turn with. A waggon with four wheels is more advantageous than a cart with two wheels, especially on sand, clay, &c. Narrow wheels and narrow plates are a disadvantage.

Suppose the waggon F G, fig. 9. is moved forward by a power acting within it, which power turns the wheel D E by the spokes A D, A D, &c. and D E turns the wheel I C, which carries the waggon. Let the power at A be 1, then the force acting at E will be $\frac{DA}{DE}$: also, if the power at E be 1, the force at C, by which the waggon is moved, will be $\frac{BE}{BC}$: therefore the power at A, to the force with which the waggon can be moved, is as 1 to $\frac{DA \times BE}{DE \times BC}$; or the power is to that force, as $DE \times BC$, to $DA \times BE$. It will be the same thing if, instead of teeth, the wheel DE carries E B by a chain going round them. You must suppose the like wheels on the opposite side. Hence, if the absolute force to move the waggon without, be 1, the force within applied at A to move it will be $\frac{DE \times BC}{BE \times DA}$.

6. It would be much more advantageous to make the four wheels of a coach or waggon large, and nearly of a height, than to make the fore wheels of only half the diameter of the hind wheels, as is usual in many places, which the following experiment will confirm.

Let us make use of a little waggon, or model, of an inch to a foot (represented *ibid.* fig. 10.) with the four wheels of five inches and nine lines; and so contrived that one may put on wheels of different diameters: as, for example, four or five inches, two of two inches three lines, two others of three inches, and let them have naves, spokes, and fellies, in proportion, to represent the wheels of a coach or waggon: let them be changed one after another, the waggon D B being always loaded with the same weight, A, of five pounds, and drawn by means of a silken thread running over a pulley, with a little bag, or scale of a ballance, to put in balls for the different wheels, according as they are to run upon even ground, upon earth, sand, or pavement. The board A F must be of oak, three feet long, plained on one side, and carved on the other, to imitate the pavements and the channels of streets. The paving stones must be of seven or eight lines instead of seven or eight inches, reducing them from inches to lines, as the wheels are reduced from feet to inches. It must be so contrived that the pulley may be turned to either side of the board. The whole being so disposed, the several experiments will answer a table, for which we refer the reader to Desagulier's Course of Experimental Philosophy, vol. i. page 223.

Wheel is also the name of a kind of punishment

niſhment which great criminals are put to in divers countries. In France, their aſſaſſins, parricides, and robbers on the highway, are condemned to the wheel; *i. e.* to have their bones firſt broken with an iron-bar on a ſcaffold, and then to be expoſed and left to expire on the circumference of a wheel. In Germany they break their bones on the wheel itſelf.

WHEEL, in the military art, is the word of command, when a battalion or ſquadron is to alter its front either one way or the other. To wheel to the right, directs the man in the right angle to turn very ſlowly, and every one to wheel from the left to the right, regarding him as their center; and *vice verſa*, when they are to wheel to the left. When a diviſion of men are on the march, if the word be to wheel to the right or to the left, then the right or left hand man keeps his ground; only turning on his heel, and the reſt of the rank move about quick till they make an even line with the ſaid right or left hand man.

WHEEL-ANIMALS, *brachionus*, a genus of animalcules which have an apparatus of arms for taking their prey. This apparatus has been ſuppoſed, by microſcopical writers, to be a kind of wheels; and thence named the creatures that are poſſeſſed of it wheel-animals.

This is one of the ſmaller animalcules; and is, by Dr. Hill, deſcribed to be, when in a ſtate of reſt, of a plain ſmooth body, of a conic figure, obtuſe at the poſterior extremity, and open at the anterior, of a duſky olive colour, and ſemi-tranſparent. When it puts itſelf in motion, it protrudes, from the open extremity, a part of its naked body; to the whole of which this outer-conic body ſeems to be but a caſe or ſheath; from the extremity of this exerted part of the body, the creature ſoon after thruſts out two protuberances, which give it the appearance of a double head; and in each of theſe is diſcovered an apparatus in a continual motion, appearing a rotatory one but in reality a vibratory one very quick repeated. Each of theſe protruded bodies has ſix arms inſerted into it, and theſe it continually ſhuts and opens over one another. Each of theſe arms is furniſhed with a double ſeries of fibres at its edge, which being expanded cauſe it to ſpread to a conſiderable breadth. There are ſeveral ſpecies of this genus of animalcules.

WHEEZING, the name of a diſtemperature in horſes, accounted by the generality of people to be the ſame with that called purſiveneſs. See PURSIVENESS.

WHELP, the young of a dog, fox, lion, or any wild beaſt. Nothing is more eſſential to the having a good pack of hounds, than a proper care of the whelps, and of the parents from which they are to be bred. The bitches in particular ſhould be carefully choſen, and ſhould be ſuch as are ſtrong and well proportioned; they muſt alſo have large ribs and flanks. See the articles DOG and HOUND.

The whelps muſt have good freſh ſtraw to lie in, and it muſt be often changed; they are to be kept in a place where neither the rain nor ſunſhine can be troubleſome to them, and once a week it will be proper to anoint them all over with a little nut-oil, with ſome ſaffron infuſed in it. This will prevent the flies from annoying them ſo much as they otherwiſe would, and will kill worms of all kinds. When they are fifteen days old it is the cuſtom to worm them, and a week after, one joint of their ſtern ſhould be twiſted off. As ſoon as they can ſee, they ſhould have milk given them to lap; and at two months old, they ſhould be weaned, keeping them wholly from the bitch. They muſt at this time be well kept, but not too high fed; and it is proper to put ſome cummin ſeed into their food, to keep the wind out of their bellies.

WHELPS, in a ſhip, the ſeaman's term for thoſe brackets which are ſet up on the capſtan cloſe under the bars; they give the ſweep to it, and are ſo contrived that the cable winding about them may not ſurge ſo much as it might otherwiſe do, if the body of the capſtan were quite round and ſmooth.

WHETSTONE, *cos*, a ſtone which ſerves for the whetting of knives and other tools upon. See the article COS.

WHEY, the ſerum, or watery part, of milk. See the article MILK.

WHIFFLER of a company, in London, a young freeman who goes before, and waits on the company on public ſolemnities.

WHIG, a party in England, oppoſite to the tories, from whom they differ chiefly in their political principles. See TORIES.

The names of whig and tory were not known till about the middle of the reign of Charles II. when theſe were given as party diſtinctions. Theſe parties may be conſidered either with regard to the ſtate, or to religion. The ſtate tories are either

either violent or moderate: the firſt would have the king to be abſolute, and therefore plead for paſſive obedience, non reſiſtance, and the hereditary right of the houſe of Steuart. The moderate tories would not ſuffer the king to loſe any of his prerogative; but then they would not ſacrifice thoſe of the people. The ſtate whigs are either ſtrong republicans or moderate ones. The firſt, ſays Rapin, are the remains of the party of the long parliament, who attempted to change the monarchy to a commonwealth: but theſe make ſo ſlender a figure, that they only ſerve to ſtrengthen the party of the other whigs. The tories would perſuade the world, that all the whigs are of this kind; as the whigs would make us believe that all the tories are violent. The moderate ſtate whigs are much in the ſame ſentiments with the moderate tories, and deſire that the government may be maintained on the antient foundation: all the difference is, that the firſt bear a little more to the parliament and people, and the latter to that of the king. In ſhort, the old whigs were always jealous of the incroachments of the royal prerogative, and watchful over the preſervation of the liberties and properties of the people. In regard to religion, the whigs have always been for limiting the power of the biſhops, and aboliſhing the convocation.

WHINE, an hunting term, uſed for the cry of an otter.

WHIP, or WHIP-STAFF, in a ſhip, a piece of timber, in form of a ſtrong ſtaff, faſtened into the helm, for the ſteerſman, in ſmall ſhips, to hold in his hand, in order to move the rudder and direct the ſhip.

WHIP-GRAFTING. See GRAFTING.

WHIPPING, in angling, is the faſtening a line to the hook or to the rod. It is alſo uſed for the caſting in of the hook, and drawing it gently on the water.

WHIPT SYLLABUB. See SYLLABUB.

WHIRL POOL, an eddy, vortex, or gulph, where the water is continually turning round. See the articles GULPH, EDDY, VORTEX, *&c.*

Theſe in rivers are very common, from various accidents, and are uſually very trivial, and of little conſequence. In the ſea they are more rare, but more dangerous. Sibbald has related the effects of a very remarkable marine whirlpool among the Orcades, which would prove very dangerous to ſtrangers, though it is of no conſequence to the people who are uſed to it. This is not fixed to any particular place, but appears in various parts of the limits of the ſea among thoſe iſlands. Wherever it appears it is very furious; and boats, *&c.* would inevitably be drawn in and periſh with it; but the people who navigate them are prepared for it, and always carry an empty veſſel, a log of wood, or large bundle of ſtraw, or ſome ſuch thing, in the boat with them; as ſoon as they perceive the whirlpool, they toſs this within its vortex, keeping themſelves out: this ſubſtance, whatever it be, is immediately received into the centre and carried under water; and as ſoon as this is done, the ſurface of the place where the whirlpool was becomes ſmooth, and they row over it with ſafety; and in about an hour they ſee the vortex begin again in ſome other place, uſually at about a mile diſtance from the firſt.

WHIRL-WIND, a wind that riſes ſuddenly, is exceeding rapid and impetuous when riſen, but is ſoon ſpent. See the articles WIND and HURRICANE.

There are divers ſorts of whirlwinds, diſtinguiſhed by their peculiar names; as the preſter, typho, turbo, exhydria, and ecnephias. The preſter is a violent wind, breaking forth with flaſhes of lightning. This is rarely obſerved; ſcarce ever without the ecnephias. Seneca ſays it is a typho or turbo kindled or ignited in the air. See the article PRESTER.

The ecnephias is a ſudden and impetuous wind, breaking out of ſome cloud, frequent in the Ethiopic ſea, particularly about the cape of Good Hope. The ſeamen call them travados. The exhydria is a wind burſting out of a cloud with a great quantity of water. This only ſeems to differ in degree from the ecnephias, which is frequently attended with ſhowers. A typho, or vortex, moſt properly called whirl-wind, or hurricane, is an impetuous wind, turning rapidly every way, and ſweeping all round the place. It uſually deſcends from on high. It is frequent in the Eaſtern-ocean, chiefly about Siam, China, *&c.* and renders the navigation of thoſe parts exceeding dangerous. See the articles VORTEX, SPOUT, *&c.*

WHISPERING. See the articles HEARING, ATTENTION, *&c.*

WHISPERING-PLACES depend upon this principle. If the vibrations of the tremulous body are propagated through a long

long tube, they will be continually reverberated from the fides of the tube into its axis, and by that means prevented from fpreading, till they get out of it; whereby they will be exceedingly increafed, and the found rendered much louder than it would otherwife be. See the article SOUND.

Hence it is, that found is conveyed from one fide of a whifpering-gallery to the oppofite one, without being perceived by thofe who ftand in the middle. The form of a whifpering-gallery is that of a fegment of a fphere, or the like arched figure; and the progrefs of the found through it may be illuftrated in the following manner: Let A B C (plate CCXCVII. fig. 4.) reprefent the fegment of a fphere; and fuppofe a low voice uttered at D, the vibrations expanding themfelves every way, fome will impinge upon the points E, E, *&c.* and from thence be reflected to the points F, from thence to G, and fo on till they all meet in C, and, by their union there, caufe a much ftronger found than in any part of the fegment whatever, even at D, the point from whence they came. Accordingly, all the contrivance in whifpering places is, that near the perfon who whifpers there may be a fmooth wall, arched either cylindrically or elliptically. A circular arch will do, but not fo well. See ARCH, ECHO, PHONICS, *&c.*

The moft confiderable whifpering places in England are, the whifpering-gallery in the dome of St. Paul's, London, where the ticking of a watch may be heard from fide to fide, and a very eafy whifper be fent all round the dome. The famous whifpering place in Gloucefter cathedral, is no other than a gallery above the eaft end of the choir, leading from one fide thereof to the other. It confifts of five angles and fix fides, the middlemoft of which is a naked window, yet two whifperers hear each other at the diftance of twenty-five yards.

WHIST, a well-known game at cards; fo called from the filence obferved during the play, which is like that of honours and ruff. See HONOURS *and ruff.*

However, as there are many ways of cheating practifed at this game, we fhall only mention a few, to put the unwary upon their guard. Some by winking, fhutting their eyes, placing their fingers, or other figns, find means to let their partners know what honours they have got: others have a way of cutting honours either to their partners or themfelves: the dealer is often crafty enough to conceal fome honours for himfelf: but the beft way of rooking is by means of breef-cards; for all the honours being fomewhat broader than the reft, your adverfary muft always cut you an honour.

WHISTLE-FISH, the cirrated gadus, with a furrow at the firft back fin, being a fmall fpecies, ufually about eight inches long, and its thicknefs not great in proportion. See the article GADUS.

WHITBY, a port-town of the north riding of Yorkfhire, fituated on the German-fea, thirty-eight miles north-eaft of York.

WHITCHURCH, a borough-town of Hampfhire, fituated ten miles north of Winchefter.

It fends two members to parliament.

WHITE, one of the colours of natural bodies. See the article COLOUR.

White is not fo properly faid to be any one colour, as a compofition of all colours; for it is demonftrated by Sir Ifaac Newton, that thofe bodies only appear white, which reflect all the kinds of coloured rays alike. See WHITENESS.

WHITE, in painting in miniature, *&c.* The beft white for painting in water-colours, is flake white, which is better than white lead; and if it be pure, far exceeds it in beauty; becaufe white lead is apt to turn blackifh, efpecially if it be ufed in a hard water: but if you ufe white lead, firft rectify it with white wine vinegar in the following manner: grind well the fineft white lead upon a porphery with vinegar; then put it into a glafs of water, ftir it about, and prefently pour off the water, while it is white, into fome other clean glafs or veffel; let it fettle, and then pour off the water from it, and it will be exceeding fine. When this white is fettled put to it gum-water, to bind it and give it a glaze.

Some recommend a white made of the whiter part of oifter-fhells, reduced into an impalpable powder; this is called pearl-white, and will mix with any colour. Some alfo recommend the powder of egg-fhells of the brighteft colour, and well cleaned and wafhed, ground with gum-water, to which may be added about a twentieth part of white fugar-candy: the egg-fhells fhould be ground to an impalpable powder. Experience proves, that egg-fhell powder is of very great fervice as a white in water colours, and both that and the powder of oifter-fhells, well

rectified

rectified and mixed with the white of an egg well beaten, will make an extraordinary mixture in other colours, and will correct them from changing or altering their qualities.

White *of the eye*, denotes the first tunic or coat of the eye, called albuginea and conjunctiva, because it serves to bind together, or inclose, the rest. See Eye.

White-friars, a name common to several orders of monks, from their being clothed in a white habit. See Monk.

White-hart *silver*, a mulct or tribute paid into the exchequer, out of certain lands in or near the forest of White-hart in Dorsetshire; imposed by Henry III. upon Thomas de la Linde, for killing a beautiful white hart which that prince had before spared in hunting.

White-horse, in ichthyology, the prickly backed raia, with two series of prickles on the tail, and one series over each eye. See the article Raia.

This is a singular species, the body is considerably broad in proportion to its length, but it is also thick; the back is somewhat gibbose, but the belly is more flat; the rostrum is oblong and acute, the eyes are prominent, and there is an aperture behind each; the mouth is transverse and large, and furnished with a number of sharp teeth; the apertures of the gills run down from it on each side along the breast, they are small, and there are five of them on each side.

White-lead, also called ceruse. See the article Ceruse.

White line, among printers, a void space of the depth or breadth of a line. See the article Printing.

White-meats, include milk, butter, cheese, white-pots, custards, and other kinds of food made of milk or eggs. Some also add chickens, veal, and fish.

White-pot, milk or cream beat up with the yolks of eggs, mixed with sugar and spice, and baked in an earthen dish, with slices of bread in it.

The cooks furnish us with a variety of dishes under this denomination; as the rice white-pot, Westminster white-pot, Norfolk white-pot, &c.

White-rent, a rent or duty of 8 d. paid annually by every tinner in the county of Devon, to the duke of Cornwall.

White-sea, in geography, a bay of the frozen ocean, in the north of Muscovy, between russian Lapland, and Samoieda.

*Spanish*-White, a kind of fucus used by ladies to heighten the complexion, and hide its defects.

It is made of tin-glass dissolved in spirit of nitre, and precipitated into a very fine powder by means of salt-water.

White-wine, wine of a bright transparent colour, bordering on white, thus called to distinguish it from the red wines. See the article Wine.

The generality of white-wines are made from white grapes; though there are some from black ones, only the skins are kept from tinging them.

WHITEHAVEN, a port-town of Cumberland, situated on the Irish channel: west long. 3° 16′, north lat. 54° 30′.

WHITENESS, *albedo*, the quality which denominates a body white. See the articles White and Colour.

Sir Isaac Newton shews, that whiteness consists in a mixture of all the colours; and that the light of the sun is only white, because consisting of rays of all colours. See the article Ray.

From the multitude of rings of colours which appear upon compressing two prisms or object-glasses of telescopes together, it is manifest that these do so interfere and mingle with one another at last, as, after eight or nine reflections, to dilute one another wholly, and constitute an even and uniform whiteness; whence, as well as from other experiments, it appears, that whiteness is certainly a mixture of all colours, and that the light which conveys it to the eye, is a mixture of rays endued with all those colours. See the article Light.

The same author shews, that whiteness, if it be most strong and luminous, is to be reckoned of the first order of colours; but if less, as a mixture of the colours of several orders. Of the former sort he reckons white metals, and of the latter, the whiteness of froth, paper, linnen, and most other white substances. And as the white of the first order is the strongest that can be made by plates of transparent substances, so it ought to be stronger in the denser substances of metals than in the rarer ones of air, water, and glass. Gold or copper mixed either by fusion, or amalgamation with a very little mercury, with silver, tin, or regulus of antimony, becomes white, which shews both that the particles of white metals have much more surface, and therefore are smaller than those of gold and copper; and also that they are so opake, as not to suffer

ſuffer the particles of gold or copper to ſhine through them. And as that author doubts not but that the colours of gold and copper are of the ſecond and third order, therefore the particles of white metals cannot be much bigger than is requiſite to make them reflect the white of the firſt order. See PARTICLE.

WHITING, in ichthyology, the engliſh name for the white gadus with no beard, and with three fins on the back, and the upper jaw longeſt. See GADUS.

The head and body of this ſpecies is compreſſed, the back is convex, the anus is at a great diſtance from the tail, and is, indeed, very near the head; the colour of the whole fiſh is a ſilvery white, except that on the back there is an admixture of a blackiſh tinge; the ſcales are very ſmall, roundiſh and white; the noſtrils have each a double aperture, and are placed high; the eyes are very large, the iris ſilvery, and the pupil large and blue; the teeth are very numerous; the pectoral fins have each twenty-one rays, and the ventral fins have each ſix rays; the pinnæ ani are two, and have, the firſt thirty-three, and the ſecond twenty-two rays. This ſpecies is frequent in our ſeas, and much eſteemed at our tables.

WHITING POLLOCK, in ichthyology, a ſpecies of gadus with three back fins, the lower jaw longeſt, and the lateral line crooked. See GADUS.

The uſual length of this fiſh is from eight to thirteen inches; it is conſiderably thick in proportion, and in moſt other reſpects reſembles the common whiting.

WHITES, in medicine, the ſame with fluor albus. See FLUOR ALBUS.

WHITLOW, in medicine. See the article PARONYCHIA.

WHITSUNDAY, a ſolemn feſtival of the chriſtian church, obſerved on the fiftieth day after Eaſter, in memory of the deſcent of the Holy Ghoſt upon the apoſtles in the viſible appearance of fiery cloven tongues, and of thoſe miraculous powers which were then conferred upon them.

It is called Whitſunday, or White-ſunday, becauſe this being one of the ſtated times for baptiſm in the antient church, thoſe who were baptiſed put on white garments, as types of that ſpiritual purity they received in baptiſm. As the deſcent of the Holy Ghoſt upon the apoſtles happened upon the day which the Jews called pentecoſt, this feſtival retained the name of pentecoſt among the chriſtians.

WHOODINGS, or HOODINGS, a ſea-term, uſed for planks joined and faſtened along the ſhip's ſides into the ſtem.

WHORE, a woman who proſtitutes herſelf for hire. See the articles CONCUBINE, COURTESAN, and HARLOT.

WHORLBAT, or HURLBAT, a kind of gauntlet, or leathern ſtrap, loaden with plummets; uſed by the antient Romans in their ſolemn games and exerciſes, and by them called cæſtus. See CÆSTUS.

WHUR, in falconry, denotes the fluttering of partridges or pheaſants, as they riſe.

WIBURG, the capital of the territory of the ſame name in Jutland: eaſt long. 9° 16′, north lat. 56° 20′.

WIBURG, a city and port-town of ruſſian Finland, ſituated on the gulph of Finland: eaſt long. 29°, north lat. 61°.

WIC, a place on the ſea ſhore, or on the bank of a river: though it properly ſignifies a town, village, or dwelling place; and ſometimes a machine.

WICCOMB CHIPPING, a borough-town of Bucks, twelve miles ſouth of Aileſbury. It ſends two members to parliament.

WICK DE DUERSTEDE, a town of the United Netherlands, in the province of Utrecht, fifteen miles ſouth-eaſt of the city of Utrecht.

WICKER, a twig of the oſier ſhrub, ſingle or wrought.

WICKET, a ſmall door in the gate of a fortified place, &c. or a hole in a door, through which to view what paſſes without.

WICKLIFFISTS, or WICKLIFFITES, a religious ſect which ſprung up in England in the reign of Edward III. and took its name from John Wickliff, doctor and profeſſor of divinity in the univerſity of Oxford, who maintained that the ſubſtance of the ſacramental bread and wine remained unaltered after conſecration; and oppoſed the doctrine of purgatory, indulgences, auricular confeſſion, the invocation of ſaints, and the worſhip of images. He maintained, that the children of the religious may be ſaved without being baptized; that prieſts may adminiſter confirmation; that there ought to be only two orders in the church, that of prieſts, and that of deacons. He made an engliſh verſion of the Bible, and compoſed two volumes, called Aletheia, that is Truth, from which John Huſſe learned moſt of his doctrines. In ſhort, to this reformer we owe the firſt hint of the reformation, which was effected about two hundred years after.

WICKLOW, a county of Ireland, in the province of Leinfter, bounded by the county of Dublin, on the north; by the Irifh channel, on the eaft; by Wexford, on the fouth; and by Kildare and Katerlagh, on the weft.

WICKWARE, a market-town of Glocefterfhire, fituated twenty miles fouth of Glocefter.

WIDGEON, in ornithology, the anas with a brown head, white front, and a tail black underneath. See ANAS.

WIDOW, a woman who has loft her hufband.

In London, a freeman's widow may exercife her hufband's trade, as long as fhe continues fuch.

Marriage with a widow, in the eye of the canon law, is a kind of bigamy.

WIDOW *of the king*, was fhe who after her hufband's death, being the king's tenant in capite, could not marry again without the king's confent.

WIFE, a married woman, or one joined with, and under the protection of, an hufband. See the article HUSBAND.

A wife, in our englifh law, is termed feme covert; and in the judgment of the law is reputed to have no will, as being fuppofed intirely under, and fubject to, that of her hufband. See the articles COVERTURE and BARON and FEME.

The wife can make no contract without the hufband's confent; and if any goods or chattels be given her, they all immediately become her hufband's: even neceffary apparel is not her's in property. All her perfonal chattels, which fhe held at her marriage, are fo much her hufband's, that after his death they fhall not return to her, but go to the executor or adminiftrator of her hufband, except only her paraphernalia. See the article PARAPHERNALIA.

The wife partakes of the honour and condition of her hufband; but none of her dignities come by marriage to her hufband; and as the law fuppofes the hufband to have the full power over his wife, he is obliged to anfwer for all her faults and trefpaffes. If a wife bring forth a child begot by a former hufband, or any other, before marriage, but born after marriage with another man; this latter muft own the child; and that child fhall be his heir at law: and if a wife bring forth a child during her hufband's abfence, though it be of many years; yet if he lived all the time within the ifland, he muft father the child, and the child, if firft born, fhall inherit. If the wife has a jointure, and during her marriage is made pregnant by her hufband, which muft appear by the child's being born alive, the hufband fhall have all his wife's lands for life; but if the wife have no jointure fettled before marriage, fhe may, after her hufband's death, challenge the third part of his yearly rents of land, during her life.

WIGGAN, a borough-town of Lancafhire, twenty-nine miles fouth of Lancafter.

It fends two members to parliament.

*Ifle of* WIGHT, part of the county of Southampton, and feparated from it by a narrow channel, is about twenty miles long, and twelve broad. The chief town is Newport.

WIGTOWN, a borough and port-town of Scotland, in the fhire of Galloway, fituated on a bay of the Irifh channel, ninety miles fouth-weft of Edinburgh.

WIHITSCH, a frontier town of Bofnia, in european Turky: eaft long. 16° 40', north lat. 45° 30'.

WILDS, a term ufed by our farmers to exprefs that part of a plough by which the whole is drawn forwards. See PLOUGH.

WILDERNESS, in gardening, a kind of grove of large trees, in a fpacious garden, in which the walks are commonly made either to interfect each other in angles, or have the appearance of meanders and labyrinths. See the articles GROVE and LABYRINTH.

Wilderneffes, fays Mr. Miller, fhould always be proportioned to the extent of the gardens in which they are made; for it is very ridiculous to fee a large wildernefs planted with tall trees in a fmall fpot of ground; and, on the other hand, nothing can be more abfurd, than to fee little paltry fquares, or quarters of wildernefs-work, in a magnificent large garden. As to the fituation of wilderneffes, they fhould never be placed too near the habitation, nor fo as to obftruct any diftant profpect of the country; there being nothing fo agreeable as an unconfined profpect; but where, from the fituation of the place, the fight is confined within the limits of the garden, nothing can fo agreeably terminate the profpect, as a beautiful fcene of the various kinds of trees judicioufly planted; and if it is fo contrived, that the termination is planted circularly, with the concave towards the fight, it will have a much better effect, than if it end in ftrait lines or angles. The

The plants ſhould always be adapted to the ſize of the plantation; for it is very abſurd for tall trees to be planted in the ſmall ſquares of a little garden; and in large deſigns ſmall ſhrubs will have a mean appearance. It ſhould alſo be obſerved, never to plant ever-greens amongſt deciduous trees; but always to place the ever-greens in a wilderneſs in a ſeparate part by themſelves, and that chiefly in ſight.

As to the walks, thoſe that have the appearance of meanders, where the eye cannot diſcover more than twenty or thirty yards in length, are generally preferable to all others, and theſe ſhould now and then lead into an open circular piece of graſs; in the center of which may be placed either an obeliſk, ſtatue, or fountain; and, if in the middle of the wilderneſs there be contrived a large opening, in the center of which may be erected a dome or banquetting-houſe, ſurrounded with a green plot of graſs, it will be a conſiderable addition to the beauty of the whole. From the ſides of the walks and openings, the trees ſhould riſe gradually one above another to the middle of the quarters, where ſhould always be planted the largeſt growing trees, ſo that the heads of all the trees may appear to view, while their ſtems will be hid from the ſight. Thus in thoſe parts which are planted with deciduous trees, roſes, honey-ſuckles, ſpiræa frutex, and other kinds of low-flowering ſhrubs, may be planted next the walks and openings; and at their feet, near the ſides of the walks, may be planted primroſes, violets, daffodils, &c. not in a ſtrait line, but ſo as to appear accidental, as in a natural wood. Behind the firſt row of ſhrubs ſhould be planted ſyringas, althæa frutex, mezereons, and other flowering ſhrubs of a middle growth; and theſe may be backed with many other ſorts of trees, riſing gradually to the middle of the quarters.

The part planted with ever-greens, may be diſpoſed in the following manner, *viz.* in the firſt line next the great walks, may be placed the laurus-tinus, boxes, ſpurge-laurel, juniper, ſavin, and other dwarf ever-greens. Behind theſe may be placed laurels, hollies, arbutuſes, and other ever-greens of a larger growth. Next to theſe may be planted alaternuſes, phyllireas, yews, cypreſſes, virginian cedars, and other trees of the ſame growth; behind theſe may be planted Norway and ſilver firs, the true pine, and other ſorts of the fir growth; and in the middle ſhould be planted Scotch pines, pinaſter, and other of the larger growing ever-greens, which will afford a moſt delightful proſpect, if the different ſhades of the greens are curiouſly intermixed.

But beſide the grand walks and openings (which ſhould always be laid with turf, and kept well mowed) there ſhould be ſome ſmaller ſerpentine-walks through the middle of the quarters, where perſons may retire for privacy; and by the ſides of theſe private walks may alſo be ſcattered ſome wood flowers and plants, which, if artfully planted, will have a very good effect.

In the general deſign for theſe wilderneſſes, there ſhould not be a ſtudied and ſtiff correſpondency between the ſeveral parts; for the greater diverſity there is in the diſtribution of theſe, the more pleaſure they will afford.

WILKOMERS, a city of Poland, in the dutchy of Lithuania: eaſt long. 25°, north lat. 55° 30′.

WILL, or *laſt* Will, in law, ſignifies the declaration of a man's mind and intent relating to the diſpoſition of his lands, goods, or other eſtate, or of what he would have done after his death.

In the common law, there is a diſtinction made between a will and a teſtament; as that is called a will, where lands or tenements are given; and when the diſpoſition concerns goods and chattles alone, it is termed a teſtament. See the article Testament.

A will, though it has no force till after the teſtator's deceaſe, does then, without any other grant, or livery, &c. give and transfer eſtates, and alter the property either of lands or goods, as effectually as any deed or conveyance executed in a perſon's life-time, and thereby diſcents may be prevented, eſtates in fee, tail, for life, or for years, be made, and he that takes lands by deviſe is in the nature of a purchaſer. Formerly a perſon could not give away by will thoſe lands that he had by diſcent, though he might ſuch as he enjoyed by way of purchaſe; but by 34 and 35 of Hen. VIII. c. 5. all perſons that have a ſole eſtate in fee-ſimple of any lands, tenements, &c. may deviſe the ſame by will at their pleaſure, to whom they think fit; and this extends to perſons ſeiſed in coparcenary, or as tenants in common; but lands intailed are not deviſable, only thoſe held in fee, and goods and chattels: but wills made by

by infants or feme coverts, ideots, and persons not of sound memory, are deemed not good in law. The 29 Car. II. c. 23. has enacted, that all wills and devises of lands, &c. shall be in writing, signed by the devisor, or some other by his express directions, in the presence of at least three credible witnesses; and no will made in writing shall be revoked, but by another will, or cancelling the same by the testator himself, or by his direction.

In the making of a will there are these several rules to be observed, *viz.* 1. That it be done while the testator is of sound mind and memory. 2. That there be two parts thereof, the one to remain in the hands of the party that made it; and the other in the custody of some friend, in order to render it less liable to be suppressed after the testator's death. 3. That the whole be written in one hand writing, and, if possible, in one sheet of paper or parchment. 4. In case there be more sheets than one, that the testator sign and seal every sheet, before the witnesses present at the execution. For the manner of proving a will, see the article PROBATE.

WILL *with a wisp*, or *Jack with a lanthorn*, a meteor known among the people under these names, but more usually among authors under that of ignis fatuus. See the article METEOR.

This meteor is chiefly seen in summer-nights, frequenting meadows, marshes, and other moist places. It seems to arise from a viscous exhalation, which being kindled in the air, reflects a sort of thin flame in the dark, without any sensible heat. See HEAT and PHOSPHORUS.

It is often found flying along rivers, hedges, &c. by reason it there meets with a stream of air to direct it. The ignus fatuus, says Sir Isaac Newton, is a vapour shining without heat; and there is the same difference between this vapour and flame, as between rotten wood shining without heat, and burning coals of fire. See the article LIGHT, &c.

WILLIAMSBURG, capital of the colony of Virginia, situated in James-county, between James-river and York-river: west long. 76° 30′, north lat. 37° 10′.

WILLIAM'S FORT, a fort belonging to the English East-India company, situated on the western branch of the river Ganges, in the province of Bengal: east long. 87°, north lat. 22° 45′.

WILLIAMSTAT, a port-town of Holland, situated on the sea called Hollands-Deep, fourteen miles south of Rotterdam.

WILLOW, *salix*, in botany. See the article SALIX.

WILNA, a city of Poland, capital of the great dutchy of Lithuania, situated on a river of the same name: east long. 25° 15′, north lat. 55°.

WILTON, a borough-town of Wiltshire, situated on the river Willey, six miles north-west of Salisbury.

It sends two members to parliament.

WILTSHIRE, a county of England, bounded by Glocestershire and Oxfordshire, on the north; by Berkshire and Hampshire, on the east; by Dorsetshire, on the south; and by Somersetshire, on the west.

WIMPFEN, a town of Germany, in the palatinate of the Rhine, situated on the river Neckar, twenty miles east of Heidelburg.

WIMPLE, a muffler, or plaited linen-cloth, which nuns wear to cover their neck and breasts. The word is sometimes used for a streamer or flag. See FLAG.

WIN, in the beginning or end of the names of places, signifies that some great battle was fought, or a victory gained there.

WINCHELSEA, a borough and port-town of Sussex, situated on a bay of the English channel, thirty miles east of Lewes.

It sends two members to parliament.

WINCHESTER, the capital city of Hampshire, situated on the river Itching, sixty-five miles south-west of London.

WIND, *ventus*, in physiology, a stream of air, flowing out of one place, or region, into another. See the article AIR.

As the air is a fluid, its natural state is that of rest, which it endeavours always to keep or retrieve by an universal equilibrium of all its parts. When, therefore, this natural equilibrium of the atmosphere happens by any means to be destroyed in any part, there necessarily follows a motion of all the circumjacent air towards that part, to restore it; and this motion of the air is what we call wind. See ATMOSPHERE.

Hence, with respect to that place where the equilibrium of the air is disturbed, we see the wind may blow from every point of the compass at the same time; and those who live northwards of that point, have a north wind; those who live southwards, a south wind; and so of the rest; but those who live on the spot, where all these

thefe winds meet and interfere, are oppreffed with turbulent and boifterous weather, whirl-winds, and hurricanes; with rain, tempeft, lightning, thunder, *&c.* For fulphureous exhalations from the fouth, torrents of nitre from the north, and aqueous vapours from every part, are there confufedly huddled, and violently blended together, and rarely fail to produce the phænomena above mentioned. See RAIN, LIGHTNING, *&c.*

Many are the particular caufes which produce wind by interrupting the equipoife of the atmofphere; but the moft general caufes are two, *viz.* heat, which, by rarifying the air, makes it lighter in fome places than it is in others; and cold, which, by condenfing it, makes it heavier. Hence it is, that in all parts over the torrid zone, the air being more rarified by a greater quantity of the folar rays, is much lighter than in the other parts of the atmofphere, and moft of all over the equatorial parts of the earth. And fince the parts at the equator are moft rarified, which are near the fun; and thofe parts are, by the earth's diurnal rotation eaftward, continually fhifting to the weft; it follows, that the parts of the air which lie on the weft fide of the point of the greateft rarefaction, and, by flowing towards it, meet it, have lefs motion than thofe parts on the eaft fide of the faid point, which follow it; and therefore the motion of the eaftern air would prevail againft that of the weftern air, and fo generate a continual eaft-wind, if this were all the effect of that rarefaction. But we are to confider, that as all the parts of the atmofphere are fo greatly rarified over the equator, and all about the poles greatly condenfed by extreme cold, this heavier air from either poles is conftantly flowing towards the equator, to reftore the ballance deftroyed by the rarefaction and levity of the air over thofe regions: hence, in this refpect alone, a conftant north and fouth wind would be generated.

We find by experience, that people in general have but an obfcure idea or confufed notion of the caufe of this perpetual current of air from eaft to weft, or of a conftant eaft wind under the equator. Therefore, in order to elucidate this matter, we fhall explain it by a figure. Let C B A D E (plate CCCI. fig. 1. nº 1.) be part of a fection of the atmofphere over the equator, C the eaft, E the weft, A the point to which the fun S is vertical, and R the point of greateft rarefaction, or that where the air is moft of all heated, and, confequently, lighteft. That this point R is on the eaftern fide of the point A, is not difficult to be conceived, when what is faid under the article TIDE, is well confidered. And, becaufe the air at R is by fuppofition lighter than where it is colder at C and D, it is plain that in order to obtain an equilibrium (which is neceffary in a fluid body) the air by its greater weight will have a tendency from C and D towards R, and rife to a height there greater than at C or D, in proportion as its denfity is lefs.

Now this being the cafe, it is evident, the fun, being always between the points R and D, will be heating the air on that part; and thofe regions between R and C, having been deferted by the fun, will grow cold: confequently, the air between C and R, as it is colder, will likewife be heavier than that between R and D which is hotter, and fo will have a greater momentum, or quantity of motion, towards the point R; and fince this point R is conftantly moving after the point A weftward, the motion of the weftern air towards it, will be in part diminifhed by that means; and being alfo inferior in quantity to the motion of the eaftern air, the latter will prevail over it, and be conftantly following the faid point R from eaft to weft, and thus produce a continual eaft wind.

It may, perhaps, be here faid, that tho' the motion of the air be lefs from D to R, yet it is fomething, and fo there ought to be a weftern wind, at leaft in fome degree, and to fome diftance weftward of the point R. To which we anfwer, that the nature of a fluid will not permit two contrary motions to reftore or fuftain an equilibrium (we mean in regard of the whole body of it) for wherever one part of the fluid is determined to move, all the reft muft neceffarily follow it; otherwife the equilibrium of the air would be deftroyed in one part to make it good in another, a defect which nature cannot be guilty of. Thus, we fee the tides of the ocean always follow the courfe of the moon from eaft to weft, without any motion of the waters from the weft towards the moon, in the open oceans; and the point R can only be confidered as the aerial tide, or flood

of

of high air; and has nearly the fame phænomena with aqueous tides. See the article TIDES.

This being clearly underftood, all the reft is eafy; for no one can find it difficult to conceive how the cold air from each pole muft neceffarily fet in towards the equator directly, where meeting and interfering with the eaftern current, it does with that compound a new direction for the moving air which lies between both the former *viz.* a north-eaft current on the north fide, and a fouth eaft on the fouth fide: all which naturally refults from the doctrine of the compofition of oblique forces. See FORCE.

And this we find to be verified in the general trade winds, which conftantly blow from the north-eaft and fouth eaft, to about thirty degrees on each fide the equator, where thofe parts are over the open ocean, and not affected with the reflection of the fun beams from the heated furface of the land; for in this cafe the wind will always fet in upon the land, as on the coaft of Guinea, and other parts of the torrid zone, we know it does.

*Velocity and force of the* WIND. As the motion of the air has a greater or leffer velocity, the wind is ftronger or weaker; and it is found from obfervation, that the velocity of the wind is various, from the rate of 1 to 50 or 60 miles per hour. The beft way to prove this, is to chufe a free open place, where the wind or current of air is not at all interrupted, but flows uniformly, or as much fo as the undulatory ftate of the atmofphere will admit: in fuch a place, a feather, or other very light body, is to be let go in the wind; and then, by a half-fecond watch, or pendulum, you muft obferve nicely to what diftance it is carried in any number of half-feconds, or in how many half-feconds it has paffed over a given or meafured fpace. This will give the rate of velocity in the wind per fecond, and of courfe per hour; which has been found, at a medium, to be 12 or 15 miles per hour: even the moft vehement wind does not fly above 50 or 60 miles per hour; and fometimes the wind is fo flow as not to exceed the velocity of a perfon riding or walking in it; and in that cafe, if the perfon goes with the wind, he finds no wind at all, becaufe there is no difference of velocity, or no relative wind, which is that only which we are fenfible of, whilft in motion.

The beft method to eftimate the force of the wind, is by means of the following anemometer. ABCDEFGHI (*ibid.* n° 2.) is an open frame of wood, firmly fupported by the fhaft or poftern I. In the crofs-pieces HK, LM, is moved an horizontal axis QM, by means of the four fails *ab*, *cd*, *ef*, *gh*, in a proper manner expofed to the wind. Upon this axis is fixed a cone of wood MNO, upon which, as the fails move round, a weight S, is raifed, by a ftring on its fuperficies, proceeding from the fmall to the largeft end NO. Upon the great end or bafe of the cone is fixed a ratchet-wheel *ik*, in whofe teeth falls the click X, to prevent any retrograde motion from the depending weight.

From the ftructure of this machine, it is eafy to underftand, that it may be accommodated to eftimate the variable force of the wind, becaufe the force of the weight will continually increafe, as the ftring advances on the conical furface, by acting at a greater diftance from the axis. And therefore, if fuch a weight be put on, on the fmalleft part at M, as will juft keep the machine in equilibrio with the weakeft wind; then, as the wind becomes ftronger, the weight will be raifed in proportion, and the diameter of the bafe of the cone NO, may be fo large in comparifon of that of the fmaller end or axis at M, that the ftrongeft wind fhall but juft raife the weight to the great end.

Thus, for example, let the diameter of the axis be to that of the bafe of the cone NO, as 1 to 28, then if S be a weight of 1 pound at M, on the axis, it will be equivalent to 28 pounds, or $\frac{1}{4}$ of an hundred, when raifed to the greateft end. If, therefore, when the wind is weakeft, it fupports 1 pound on the axis, it muft be 28 times as ftrong to raife the weight to the bafe of the cone. Thus may a line of 28 equal parts be drawn on the fide of the cone, and the ftrength of the wind will be indicated by that number on which the ftring fhall at any time hang.

The ftring may alfo be of fuch a fize, and the cone of fuch a length, that there may be fixteen revolutions of the ftring betwixt each divifion of the fcale on the cone, whence the ftrength of the wind will be expreffed in pounds and ounces. And if greater exactnefs be required, let the periphery of the cone's bafe be divided into 16 equal parts; then, whenever the equilibrium happens, the ftring will leave the conic furface againft one of thofe

thoſe diviſions, and thus ſhew the force of the wind to a dram avoirdupoiſe weight.

*Cardinal* WINDS, are thoſe which blow from the eaſt, weſt, north, and ſouth, which are called cardinal points.

*Collateral* WINDS, are thoſe which blow between the cardinal points. The number of theſe is infinite, as the number of points they blow from are; a few of them only are conſidered in practice, and theſe have names compounded of the cardinal points between which they blow. See the article COMPASS.

WIND GUN, or AIR-GUN. See AIR-GUN.

WIND-MILL, a kind of mill, the internal parts of which are much the ſame with thoſe of a water-mill; from which however it differs, in being moved by the impulſe of the wind upon its vanes, or ſails, which are to be conſidered as a wheel on the axle. See the articles MILL and AXIS.

A deſcription of the mechaniſm of this uſeful engine, will, no doubt, be acceptable to our readers. AHO (pl. CCCI. fig. 2. n° 1.) is the upper room; HOZ, the under one; AB, the axle-tree, going quite through the mill; STVW, the ſails, covered with canvas, ſet obliquely to the wind, and going about in the order STVW; CD, the cog-wheel, of about 48 cogs, *a*, *a*, *a*, *&c.* which carry round the lantern EF, of 8 or 9 roundles *c*, *c*, *c*, *&c.* together with its axis GN. IK is the upper mill-ſtone; and LM, the lower one. QR is the bridge, ſupporting the axis or ſpindle GN: this bridge is ſupported by the beams *cd*, XY, wedged up at *c*, *d*, and X. ZY is the lifting-tree, which ſtands upright; *ab*, *ef*, are levers, whoſe centers of motion are Z and *e*; *fghi* is a cord, with a ſtone *i*, going about the pins *g* and *h*, and ſerving as a ballance or counterpoiſe. The ſpindle *t*N is fixed to the upper mill-ſtone IK, by a piece of iron called the rind, and fixed in the under ſide of the ſtone; which is the only one that turns about, and its whole weight reſts upon a hard ſtone, fixed in the bridge QR, at N. The trundle EF, and axis G*t*, may be taken away; for it fixes on the lower part at *t*, by a ſquare ſocket, and the top runs in the edge of the beam *w*. Putting down the end *f*, of the lever *fe*, raiſes *b*, which raiſes ZY, which raiſes YX, and this raiſes the bridge QR, with the axis NG, and the upper ſtone IK; and thus the ſtones are ſet at any diſtance. The lower immoveable ſtone is fixed upon ſtrong beams, and is broader than the upper one. The flour is conveyed through the tunnel *no*, down into a cheſt P is the hopper, into which is put the corn, which runs along the ſpout *r*, into the hole *t*, and ſo falls between the ſtones, where it is ground. The axis G*t* is ſquare, which ſhaking the ſpout *r*, as it goes round, makes the corn run out: *rs* is a ſtring going about the pin *s*, and ſerving to move the ſpout nearer or farther from the axis, ſo as to make the corn run faſter or ſlower, according to the velocity and force of the wind. And when the wind is great, the ſails S, T, V, W, are only part, or one ſide of them, covered; or perhaps only a half of two oppoſite ſails. Towards the end B, of the axle-tree, is placed another cog-wheel, trundle, and mill-ſtones, with exactly the ſame apparatus; ſo that the ſame axle-tree carries two ſtones at once: and when only one pair is to grind, the trundle EF, and axis G*t* is taken out from the other. *xyl* is a girt of pliable wood, fixed at the end *x*; and the other end *l*, tied to the lever *km*, moveable about *k*. And the end *m* being put down, draws the girt *xyl* cloſe to the cog-wheel; whereby the motion of the mill is ſtopped at pleaſure: *pq* is a ladder going into the higher part of the mill; and the corn is drawn up by means of a rope, rolled about the axis AB, when the mill is going.

In mills built of wood, the whole body of the mill turns round to the wind, on a tampin, or perpendicular poſt; but in thoſe of ſtone, only the upper part turns in this manner. See the mill-houſe repreſented *ibid.* n° 2. where 1 is the houſe itſelf, which is turned about to the wind by a man, with the help of the lever or beam 2: 3, is a roller to hoiſt up the ſteps 4.

In thoſe built of ſtone, only the roof E (*ibid.* n° 3.) together with axis and ſails AB, CD, turn round; in order to which, the roof is built turret-wiſe, the turret being encompaſſed with a wooden ring, in which is a groove, at the bottom of which a number of braſs-truckles are placed at a certain diſtances; and within this groove is another ring, upon which the whole turret ſtands. To the upper or moveable ring are connected beams with a rope, by means of which, and a windlaſs below, the top of the machine, together with the ſails, may be turned round,

round, and put in the direction required.

*Position of, and force of the* WIND, *upon the sails.* As to the position of the sails, we must consider, that if they are placed direct to the wind, or at right angles to the axis of the mill, they will receive the whole force of the wind, which in this case will tend to blow them forward, and consequently to blow down the mill; which position of course cannot be admitted.

If the sails are set right to the wind, or parallel with the axis of the mill, it is plain that in that position the wind cannot act upon them at all, and therefore they cannot be turned round, nor the mill put in motion; which position of the sails must likewise be rejected.

Since neither the direct nor right position of the sails will do, an oblique position must, as there can be no other. Now to shew that an oblique position of the sails will turn the mill, let A B (*ibid.* n° 4.) be the axis, C D a sail, and its angle of obliquity (*viz.* that which it makes with the axis) be E C G; then if G C be the force of the wind in the direct position of the sail, G E will be the force of the wind in its oblique position (as being the sine of the angle of incidence G C E.) But the force G E is resolvable into two others, E F and G F; of which the latter, being parallel to the axis, avails nothing in turning the sail about it; but the other, E F, being perpendicular thereto, is wholly spent in compelling the sail to turn round: which was the thing to be shewn.

The force of the wind on the sail will be as the square of the sine of incidence, or as $\overline{GE}^2$; for the force of each single particle of air will be as the sine G E; and it will be also as the number of particles which strike at the same time, which number of particles is also as the sine of incidence G E. For let C D represent the section of the sail in a direct position, and C G the same in an oblique position, it is plain the number of particles striking it in the former case, will be to the number striking it in the latter, as C D to C F, which is equal to G E, the sine of incidence; for all the particles between A D and B F, will not come upon the sail in the oblique position C G. Since then the force of the wind on the sail is on two accounts as G E, it will be as the square of the said line G E.

If we suppose the velocity of the wind to vary, the force thereof will be as the square of the velocity; for the greater the velocity, the greater will be the stroke of each single particle, and also the greater will be the number of particles coming upon the sail in the same time; the force will be therefore as the squares of the velocity.

Again, if the area of the sail be variable, the force of the wind will be directly as the area or superficies of the sail; because the number of particles of the air coming upon it, will always be proportional thereto, and consequently the force with which they strike it. Hence, if A, S, and V represent the area, sine of incidence, and velocity of the wind on one sail; and $a$, $s$, and $v$, those on another: the force compelling the former to turn round, will be to that compelling the latter, as $A \times S^2 \times V^2$ to $a \times s^2 \times v^2$.

When the area of the sail and its position in respect to the wind, continue the same, the force which turns the sail will be as the squares of the velocity; and since the wind scarce ever blows with one uniform velocity, but varies with almost every blast, the force upon the sail will be much more variable and unequal; and therefore the action or working of a wind-mill cannot be so equal, uniform, and steady as that of a water-mill, whose power is always of the same tenor, while the jet of water is so.

If the area of the sail and the velocity of the wind be supposed constant, the force of the wind in the direct position will be to that in the oblique one as $\overline{GC}^2$ to $\overline{GE}^2$, as we have before shewn; and it has been also shewn that that part of the force which turns the sail is represented by E F, when G E is the whole force: but GE : EF (: : GC : CE) : : $\overline{GE}^2 : \frac{CE \times \overline{GE}^2}{GC} =$ to the force which turns the sail, when the whole force is represented by $\overline{GE}^2$, as is here the proper expression of it.

This expression $\frac{CE \times \overline{GE}^2}{GC}$ begins from nothing, when the angle of incidence begins to be oblique, and increases with the obliquity of the said angle to a certain number of degrees; because that part of the force which is parallel to the axis becomes lesser in proportion to that which is perpendicular to it: but after it has passed this limit, it again decreases, and becomes nothing, when the angle of incidence

dence vaniſhes; as is eaſy to underſtand, by conſidering that the quantity of wind on the ſail does in this caſe continually decreaſe.

There is therefore one certain poſition of the ſail, in which the force of the wind is greateſt of all upon it, or a maximum; and to find it, put radius $GC = a$, $EC = x$, and we have $\overline{GE}^2 = aa - xx$, and conſequently the force $\frac{CE \times \overline{GE}^2}{GC} = \frac{aax - xxx}{a}$, which muſt be a maximum: therefore its fluxion $aa\dot{x} - 3xx\dot{x} = 0$; whence $aa = 3xx$, and ſo $x = \sqrt{\frac{aa}{3}}$ which in logarithms is $\frac{20,000000 - 0,477121}{2} = 9,761439$, which is the logarithm ſine of the angle 35° 16′ = the angle CGE; and therefore the angle ECG is equal to 54° 44′, when the force of the wind is a maximum, as required.

The angle now found, is only that which gives the wind the greateſt force to put the ſail in motion, but not the angle which gives the force of the wind a maximum upon the ſail when in motion. What this angle is, Mr. Mac Laurin has ſhewn in his book of Fluxions, to which we refer the reader.

Mr. Parent has alſo ſhewn, that an elliptic form of the ſails is better than the parallelogram, or long ſquare; and that the beſt poſition of the ſail is not that which is common, *viz.* with its longeſt ſide or diameter parallel to the axis of the ſail; but, on the contrary, it ought to be perpendicular to it; that is, they ought to be of ſuch a form, and placed in ſuch a manner, as repreſented *ibid.* n° 5. and after the four ſails B, C, D, E, are thus placed on the axis or arm A, they are then to be turned about, and fixed under the proper angle of obliquity abovementioned.

There are three things yet wanting to the perfection of a wind-mill. 1. Some contrivance in the nature of a fly, to regulate the motion of the train, under the irregular and unequal impulſe of the wind. 2. Some other contrivance to ſupply the hopper, or ſtones, with more or leſs corn, in proportion to the greater or leſs ſtrength of the wind. 3. A method of altering the angle of the ſail's obliquity, from its maximum of 54° 44′, at the beginning of the motion, to its minimum, when in motion.

WIND, in the menage. A horſe that carries in the wind, is one that toſſes his noſe as high as his ears, and does not carry handſomely. The difference between carrying in the wind, and beating upon the hand, is, that the horſe who beats upon the hand, ſhakes his head, and reſiſts the bridle; but he who carries in the wind, puts up his head without ſhaking, and only ſometimes beats upon the hand. The oppoſite to carrying in the wind, is arming and carrying low.

WIND-FLOWER, *anemone*, in botany, a genus of the polyandria-polygynia claſs of plants, the corolla whereof conſiſts of two or three orders of petals, three in each order or ſeries; they are of an oval figure, and erecto-patent: there is no pericarpium; the receptacle is globoſe or oblong, and attenuated and punctated; the ſeeds are numerous, acuminated, and have the ſtyles affixed to them.

WIND-GALL, a name given by our farriers to a diſtemperature of horſes. In this caſe there are bladders full of a corrupt jelly, which, when let out, is thick, and of the colour of the yolk of an egg. They vary in ſize, but are more uſually ſmall than large. Their place is about the fetloc-joint, and they grow indifferently on all four legs, and are often ſo painful, eſpecially in the ſummer ſeaſon, when the weather is hot, and the ground dry and hard, that they make the creature frequently ſtumble, or even fall down. The general method of cure is to open the ſwelling, about the length of a bean, and to preſs out the jelly: when this is done, they apply a mixture of the oil of bays, and the white of an egg, covering it with tow. Another method is, after the jelly is all ſqueezed out, to wrap round the part a wet woollen-cloth, and then applying a taylor's hot iron, this is to be rubbed over till the moiſture is carried away; it is then to be daubed all over with pitch, maſtich, and reſin, boiled together, laying tow in plenty over all. The wind galls that are ſituated near the ſinews, are much the moſt painful of all, and ſooneſt make the horſe lame.

The general cauſe of wind-galls is ſuppoſed to be extreme work or exerciſe in hot weather; but it is to be obſerved, that thoſe horſes which have long joints, will be wind-galled if they work never ſo little. The worſt wind-galls are thoſe of

of the hinder legs; all the above-mentioned methods will frequently miſs of ſucceſs in theſe, and nothing but fire will cure them.

Wind hatch, in mining, a term uſed to expreſs the place at which the ore is taken out of the mines.

Wind-sails, in a ſhip, are made of the common ſail-cloth, and are uſually between twenty-five and thirty feet long, according to the ſize of the ſhip, and are of the form of a cone ending obtuſely: when they are made uſe of, they are hoiſted by ropes to about two thirds or more of their height, with their baſis diſtended circularly by hoops, and their apex hanging downwards in the hatch-ways of the ſhip; above each of theſe, one of the common ſails is ſo diſpoſed, that the greateſt part of the air ruſhing againſt it, is directed into the wind-ſail, and conveyed, as through a funnel, into the upper parts of the body of the ſhip.

Wind-shock, a name given by our farmers to a diſtemperature to which fruit-trees, and ſometimes timber trees, are ſubject. Mortimer is of opinion that the wind-ſhock is a ſort of bruiſe and ſhiver throughout the whole ſubſtance of the tree; but that the bark being often not affected by it, it is not ſeen on the outſide, while the inſide is twiſted round, and greatly injured. It is by ſome ſuppoſed to be occaſioned by high winds; but others attribute it to lightening. Thoſe trees are moſt uſually affected by it, whoſe boughs grow more out on one ſide than on the other.

The beſt way of preventing this in valuable trees, is to take care, in the plantation, that they are ſheltered well, and to cut them frequently in a regular manner, while young. The winds not only twiſt trees in this manner, but they often throw them wholly down: in this caſe the common method is to cut up the tree for firing, or other uſes; but if it be a tree that is worth preſerving, and it be not broken, but only torn up by the roots, it may be proper to raiſe it again, by the following method: let a hole be dug deep enough to receive its roots, in the place where they before were: let the ſtraggling roots be cut off, and ſome of the branches, and part of the head of the tree; then let it be raiſed; and when the torn-up roots are replaced in the earth, in their natural ſituation, let them be well covered, and the hole filled up with rammed earth; the tree will, in this caſe, grow as well, and perhaps better, than before. If nature be left to herſelf, and the tree be not very large, the pulling off the roots will raiſe it.

Wind-tackle-blocks, in a ſhip, are the main double blocks, which being made faſt to the end of a ſmall cable, ſerve for hoiſting of goods into the ſhip, &c. See Block, Tackle, &c.

*To* Wind, or Wend *a ſhip*, ſignifies to bring her head about. *How winds or wends the ſhip?* is a queſtion aſked by mariners, concerning a ſhip under ſail; ſignifying as much as, upon what point of the compaſs does ſhe lie with her head?

Wind-taught, a ſea-term, ſignifying as much as ſtiff in the wind. See the article Taught.

Too much rigging, high maſts, or any thing catching or holding wind aloft, is ſaid to hold a ſhip wind-taught; by which they mean, that ſhe ſtoops too much in her ſailing in a ſtiff gale of wind. Again, when a ſhip rides in a main ſtreſs of wind and weather, they ſtrike down her top-maſts, and bring her yards down, which otherwiſe would hold too much wind, or be too much diſtended, or wind-taught.

Wind-ward, in the ſea-language, denotes any thing towards that point from whence the wind blows, in reſpect of a ſhip: thus windward-tide, is the tide which runs againſt the wind. See the articles Tide, &c.

*Large* Wind. In the ſea-language, to ſail with a large wind, is the ſame as with a fair wind.

*Side* Wind, at ſea, that which blows on the ſide of the ſhip.

WINDAGE *of a gun*, the difference between the diameter of the bore, and the diameter of the ball. See Gun.

WINDASS, Wandass, or Wanlass, an antient term in hunting: thus, to drive the windaſs, ſignifies the chaſing a deer to a ſtand where one is ready, with a bow or gun, to ſhoot. See the article Hunting.

WINDER-MEB, in ornithology, the grey and white larus, with a yellow beak. See the article Larus.

This bird is of the ſize of our widgeon, and at a diſtance appears to be all over white; the head is remarkably large, and rounded; the ears are large, as alſo are the eyes, the iris of which is of a beautiful gold yellow, and the pupil black as jet; the beak is about an inch

and a quarter long, confiderably thick, very much arched and hooked, and pointed at the extremity; the chap is entirely yellow, and has a large protuberance; the legs are very flender and yellow; the thighs are naked half the way up; and the feet are webbed.

WINDERS *of wool*. See the article WOOL-WINDERS.

WINDING STAIRS. See STAIRS.

WINDLASS, or WINDLACE, a machine ufed to raife huge weights withal, as guns, ftones, anchors, &c. See MACHINE.

It is very fimple, confifting only of an axis, or roller, fupported horizontally at the two ends, by two pieces of wood and a pully: the two pieces of wood meet at top, being placed diagonally, fo as to prop each other; the axis, or roller, goes through the two pieces, and turns in them. The pully is faftened at top where the pieces join. Laftly, there are two ftaves or handfpikes go through the roller, whereby it is turned, and the rope which comes over the pulley is wound off and on the fame.

WINDLASS, in a fhip, is an inftrument in fmall fhips, placed upon the deck, juft abaft the foremaft. It is made of a piece of timber fix or eight feet fquare, in form of an axle-tree, whofe length is placed horizontally upon two pieces of wood at the ends thereof, and upon which it is turned about by the help of handfpikes put into holes made for that purpofe. This inftrument ferves for weighing anchors, or hoifting of any weight, in or out of the fhip, and will purchafe much more than any capftan, and that without any danger to thofe that heave; for if in heaving the windlafs about, any of the handfpikes fhould happen to break, the windlafs would pall of itfelf.

WINDOW, *q. d.* wind-door, an aperture or open place in the wall of a houfe, to let in the wind and light. See the article HOUSE.

We have various forms of windows, as, arched windows, circular windows, elliptical windows, fquare and flat windows, round windows, oval windows, gothic windows, regular windows, ruftic windows, and fky-lights.

The chief rules in regard to windows, are, 1. That they be as few in number, and as moderate in dimenfions, as may confift with other due refpects; inafmuch as all openings are weakenings. 2. That they be placed at a convenient diftance from the angles, or corners of the building; becaufe that part ought not to be enfeebled, whofe office is to fupport and faften all the reft of the building. 3. That care be taken that the windows are all equal one with another, in their rank and order; fo that thofe on the right hand may anfwer to thofe on the left, and thofe above be right over thefe below; for this fituation of windows will not only be handfome and uniform, but alfo the void being upon the void, and the full upon the full, it will be a great ftrengthening to the whole fabric.

As to their dimenfions, care is to be taken not to give them more or lefs light than is needful; that is, to make them no bigger, nor lefs, than is convenient; therefore, regard is to be had to the bignefs of the rooms which are to receive the light: it is evident, that a great room needs more light, and, confequently, a greater window than a little room, and *è contra*. The apertures of windows, in middle-fized houfes, may be four and a half, or five feet, between the jaumbs, and in greater buildings fix and a half, or feven feet, and their height may be double their length at the leaft. But in high rooms, or larger buildings, their height may be a third, a fourth, or half a breadth more than double their length. Thefe are the proportions of the windows for the firft ftory; and according to thefe muft the upper ftories be for breadth; but, as for height, they muft diminifh: the fecond ftory may be one-third part lower than the firft, and the third one-fourth part lower than the fecond. See the article BUILDING.

For architrave windows, dormer windows, tranfom windows, fee the articles ARCHITRAVE, DORMER, &c.

For the fcenography of windows, fee the article SCENOGRAPHY.

WINDSOR, a borough-town of Berkfhire, twenty miles weft of London, moft remarkable for the magnificent palace or caftle fituated there on an eminence, which commands the adjacent country for many miles, the river Thames running at the foot of the hill. The knights of the garter are inftalled in the royal chapel here.

It fends two members to parliament.

WINDY TUMOURS. See TUMOUR.

WINE, *vinum*, a brifk, agreeable, fpirituous and cordial liquor, drawn from vegetable bodies and fermented. See the articles VEGETABLE and FERMENTATION.

The character of a wine, according to Boerhaave, is, that the first thing it affords by distillation, be a thin, oily, inflammable fluid called a spirit. See the article SPIRIT.

This distinguishes wines from another class of fermented vegetable juices, *viz.* vinegar, which instead of such spirit, yields, for the first thing, an acid uninflammable matter. See VINEGAR.

All sorts of vegetables, fruits, seeds, roots, &c. afford wine; as grapes, currants, mulberries, elder-berries, cherries, apples, pulse, beans, pease, turneps, radishes, and even grass itself. Hence under the class of wines, or vinous liquors, come not only wines absolutely so called, but also ale, cyder, &c. See VINOUS, MALT-LIQUOR, ALE, CYDER, &c.

WINE is, in a more peculiar manner, appropriated to that which is drawn from the fruit of the vine, by stamping its grapes in a vat, or crushing and expressing the juice out of them in a press, and then fermenting, &c. See WINE, VINEYARD, GRAPE, PRESS, &c.

The goodness of wine consists in its being neat, dry, fine, bright, and brisk, without any taste of the soil, of a clean steddy colour, having a strength without being heady, a body without being sour, and keeping without growing hard or eager. The difference of flavour, taste, colour, and body, in wines, is, perhaps, as much owing to the different manner and time of pressing, gathering, fermenting, &c. the grape, as to any difference of the grape itself. In Hungary, whence tockay and some of the richest and highest flavoured wines come, they are extremely curious in these respects: for their prime and most delicate wines, the grape is suffered to continue upon the vine, till it is half dried by the heat of the sun; and, if the sun's heat should not prove sufficient, they are dried by the gentle heat of a furnace, and then picked one by one from the stalks; the juice of this grape, when pressed out, is of a fine flavour, and sweet as sugar: this, after due fermentation, is kept for a year, and then racked from the lees, when it proves a generous, oily, rich wine, and is sold at a very high rate. The Hungarians prepare a second sort of wine, by collecting together the better kind of grapes, carefully picking the fruit from the stalks, and then pressing out the juice: this is extremely sweet, and is made richer by infusing in it, after it has fermented for some days, a sufficient quantity of half dried grapes. This wine is very sweet, oily, of a grateful taste, and retains these qualities for a long time. There is a third sort made from the pure juice of the same kind of grape, without any addition. This is a more brisk and lively wine, and far less sweet. They likewise prepare a fourth sort, from grapes of different goodness mixed together; this, though not so generous, is nevertheless an excellent wine. These hungarian wines are remarkable for preserving their sweetness, and for the delicacy of their taste and smell; they, likewise, do not grow easily vapid, and may be kept in perfection for many years.

Wine being a liquor mostly of foreign produce, the divers names, forms, kinds, distinctions, &c. thereof, are borrowed from the countries where it is produced; the principal whereof, at this day, is France, to wines of which country, a good part of what we have to say of this noble liquor, will more immediately belong.

Wine in France is distinguished from the several degrees and steps of its preparation, into, 1. *Mere goutte*, mother drop, which is the virgin wine, or that which runs of itself out at the top of the vat wherein the grapes are laid, before the vintager enters to tread or stamp the grapes. 2. Must, surmust, or stum, which is the wine or liquor in the vat, after the grapes have been trod or stamped. 3. Pressed wine, being that squeezed with a press out of the grapes half bruised by the treading. The husks left of the grapes are called rope, murk, or mark, by throwing water upon which, and pressing them afresh, they make a liquor for servants use, answerable to our cyderkin, and called *boisson*, which is of some use in medicine, in the cure of disorders occasioned by viscid humours. 4. Sweet wine, is that which has not yet worked nor fermented. 5. Bouru, that which has been prevented working by casting in cold water. 6. Worked wine, that which has been let work in the vat, to give it a colour. 7. Boiled wine, that which has had a boiling before it worked, and which by that means still retains its native sweetness. 8. Strained wine, that made by steeping dry grapes in water, and letting it ferment of itself.

Wines are also distinguished with regard to their colour into white wine, red wine, claret wine, pale wine, rose, or black wine; and

and with regard to their country, or the foil that produces them into french wines, fpanifh wines, rhenifh wines, hungary wines, greek wines, canary wines, *&c.* and more particularly into port wine, madeira wine, burgundy wine, champain wine, falernian wine, tockay wine, fchiras wine, *&c.*

*Method of making, fining*, &c. WINE. In the fouthern parts of France, their way is with red wines to tread or fqueeze the grapes between the hands, and to let the whole ftand, juice and hufks, till the tincture be to their liking; after which they prefs it. But for white wines, they prefs the grapes immediately; when preffed, they tun the muft and ftop up the veffel, only leaving the depth of a foot or more to give room for it to work. At the end of ten days they fill this fpace with fome other proper wine, that will not provoke it to work again. This they repeat from time to time, new wine fpending itfelf a little before it comes to perfection.

The ufual method of fining down wines, fo as to render them expeditioufly bright, clear, and fit for ufe, is this. Take an ounce of ifinglafs, beat it into thin fhreads with a hammer, and diffolve it, by boiling, in a pint of water; this, when cold, becomes a ftiff jelly. Whifk up fome of this jelly into a froth with a little of the wine intended to be fined, then ftir it well among the reft in the cafk, and bung it down tight; by this means the wine will become bright in eight or ten days. This method, however, is found to be beft fuited to the white wines; for the red ones, the wine-coopers commonly ufe the whites of eggs beat up to a froth, and mixed in the fame manner with their wines.

They fine it down alfo by putting the fhavings of green beech into the veffel, having firft taken off all the rind, and boiled them an hour in water to extract their ranknefs, and afterwards dried them in the fun, or in an oven. A bufhel of thefe ferve for a tun of wine: and being mafhed, they ferve again and again, till almoft quite confumed.

For englifh wine, the method recommended by Mortimer, is firft to gather the grapes when very dry, to pick them from the ftalks, then to prefs them, and let the juice ftand twenty-four hours in a vat covered. Afterwards to draw it off from the grofs lees, and then put it up in a cafk, and to add a pint or quart of ftrong red or white port to every gallon of juice, and let the whole work, bunging it up clofe, and letting it ftand till January; then bottle it in dry weather. Bradley chufes to have the liquor, when preffed, ftand with the hufks, ftalks, and all in the vat, to ferment for fifteen days.

The method of converting white-wine into red, fo much practifed by the modern wine coopers, Dr. Shaw obferves, is this. Put four ounces of turnefole rags into an earthen veffel, and pour upon them a pint of boiling water; cover the veffel clofe, and leave it to cool; ftrain off the liquor, which will be of a fine deep red, inclining to purple. A fmall portion of this colours a large quantity of wine. This tincture might be either made in brandy, or mixed with it, or elfe made into a fyrup, with fugar, for keeping. A common way with the wine-coopers is to infufe the rags cold in wine for a night or more, and then wring them out with their hands; but the inconveniency of this method is, that it gives the wine a difagreeable tafte; or what is commonly called the tafte of the rag; whence the wines, thus coloured, ufually pafs among judges for preffed wines, which have all this tafte from the canvas rags in which the lees are preffed. The way of extracting the tincture, as here directed, is not attended with this inconvenience; but it loads the wine with water; and if made into a fyrup, or mixed in brandy, it would load the wine with things not wanted, fince the colour alone is required. Hence the colouring of wines has always its inconveniences. In thofe countries which do not produce the tinging grape, which affords a blood-red juice, wherewith the wines of France are often ftained, in defect of this, the juice of elder-berries is ufed, and fometimes logwood is ufed at Oporto.

The colour afforded by the method here propofed, gives wine the tinge of the Bourdeaux-red, not the port; whence the foreign coopers are often diftreffed for want of a proper colouring for red wines in bad years. This might, perhaps, be fupplied by an extract made by boiling ftick-lack in water. The fkins of tinging grapes might alfo be ufed, and the matter of the turnefole procured in a folid form, not imbibed in rags.

Stahl obferves, that it is a common accident, and a difeafe in wines, to be kept too hot; which is not eafy to cure when it has been of any long continuance, otherwife it may be cured by introducing a fmall

a ſmall artificial fermentation, that new ranges the parts of the wine, or rather recovers their former texture: but the actual expoſing of wine to the fire, or the ſun, preſently diſpoſes it to turn eager; and the making it boiling hot, is one of the quickeſt ways of expediting the proceſs of making of vinegar.

On the other hand, wine kept in a cool vault, and well ſecured from the external air, will preſerve its texture entire in all the conſtituent parts, and ſufficiently ſtrong for many years, as appears not only from old wines, but other foreign fermented liquors, particularly thoſe of China, prepared from a decoction of rice, which being well cloſed down in a veſſel, and buried deep under ground, will continue, for a long ſeries of years, rich, generous, and good, as the hiſtories of that country univerſally agree in aſſuring us.

The moſt general remedy hitherto known for all the diſeaſes of wines, is a prudent uſe of tartarized ſpirit of wine, which not only enriches, but diſpoſes all ordinary wines to grow fine.

If either by fraud or accident a larger portion of water is mixed with wine than is proper for its conſiſtence, and no way neceſſary or eſſential, this ſuperfluous water does not only deprave the taſte, and ſpoil the excellence of the wine, but alſo renders it leſs durable; for humidity in general, and much more a ſuperfluous aqueous humidity, is the primary and reſtleſs inſtrument of all the changes that are brought on by fermentation. It may doubtleſs, therefore, be uſeful, and ſometimes abſolutely neceſſary, to take away this ſuperfluous water from the other part which ſtrictly and properly conſtitutes the wine. This has been agreed upon on all hands as a thing proper; but the manner of doing it has not been well agreed on; ſome have propoſed the effecting it by means of heat and evaporation, others by percolation, and others by various other methods, all found unſucceſsful when brought to the trial; but the way propoſed by Dr. Shaw from Stahl, is the moſt certain and commodious; this is done by a concentration of the wine, not by means of heat, but of cold.

If any kind of wine, but particularly ſuch as has never been adulterated, be in a ſufficient quantity, as that of a gallon or more, expoſed to a ſufficient degree of cold in froſty weather, or be put into any place where ice continues all the year, as in our ice-houſes, and there ſuffered to freeze, the ſuperfluous water that was originally contained in the wine, will be frozen into ice, and will leave the proper and truly eſſential part of the wine unfrozen, unleſs the degree of cold ſhould be very intenſe, or the wine but weak and poor. This is the principle on which Stahl founds his whole ſyſtem of condenſing wines by cold. When the froſt is moderate, the experiment has no difficulty, becauſe not above a third or a fourth part of the ſuperfluous water will be froze in a whole night; but if the cold be very intenſe, the beſt way is, at the end of a few hours, when a tolerable quantity of ice is formed, to pour out the remaining fluid liquor, and ſet it in another veſſel to freeze again by itſelf. If the veſſel, that thus by degrees receives the ſeveral parcels of the condenſed wine, be ſuffered to ſtand in the cold freezing place, where the operation is performed, the quantity lying thin in the pouring out, or otherwiſe, will be very apt to freeze anew; and if it be ſet in a warm place, ſome of this aqueous part thaws again, and ſo weakens the reſt. The condenſed wine, therefore, ſhould be emptied in ſome place of a moderate degree as to cold or heat, where neither the ice may diſſolve, nor the vinous ſubſtance mixed among it be congealed. But the beſt expedient of all is to perform the operation with a large quantity of wine, or that of ſeveral gallons, where the utmoſt exactneſs, or the danger of a trifling waſte, need not be regarded.

By this method, when properly performed, there firſt freezes about one third part of the whole liquor; and this is properly the more purely aqueous part of it, inſomuch that when all the vinous fluid is poured off, to be again expoſed to a concentration, the ice remaining behind, from this firſt freezing, being ſet to thaw in a warm place, diſſolves into a pure and taſteleſs water. The frozen part, or ice, conſiſts only of the watery part of the wine, and may be thrown away, and the liquid part retains all the ſtrength, and is to be preſerved. This will never grow ſour, muſty, or mouldy afterwards, and may at any time be reduced to wine of the common kind again, by adding to it as much water as will make it up to the quantity that it was before.

Wines in general may by this method be reduced to any degree of vinosity or perfection.

The benefit and advantage of this method of congelation, if reduced to practice in the large way, in the wine countries, must be evident to every body. Concentrated wines, in this manner, might be sent into foreign countries, instead of wine and water, which is what is usually now sent, the wines they export being loaded, and in danger of being spoiled by three or four times their own quantity of unnecessary, superfluous, and prejudicial water.

An easy method of recovering pricked wines, may be learned from the following experiment: take a bottle of red port that is pricked, add to it half an ounce of tartarized spirit of wine, shake the liquor well together, and set it by for a few days, and it will be found very remarkably altered for the better.

This experiment depends upon the useful doctrine of acids and alkalies. All perfect wines have naturally some acidity, and when this acidity prevails too much, the wine is said to be pricked, which is truly a state of the wine tending to vinegar: but the introduction of a fine alkaline salt, such as that of tartar, imbibed by spirit of wine, has a direct power of taking off the acidity, and the spirit of wine also contributes to this, as a great preservative in general of wines. If this operation be dexterously performed, pricked wines may be absolutely recovered by it, and remain saleable for some time: and the same method may be used to malt liquors just turned sour.

The age of wine is properly reckoned by leaves; thus they say wine of two, four, or six leaves, to signify wine of two, four, or six years old; taking each new leaf put forth by the vine, since the wine was made, for a year.

The net duties to be paid on importation of all wines into the port of London, and repaid on exportation, are as follows. Wines imported by British for sale. Rhenish, german, or hungary wines, the ton, filled in casks, pay, on importation, 35 l. 2 s. $\frac{72}{100}$ d. and, on exportation, draw back 26 l. 13 s. $8\frac{88}{100}$ d. in bottles, on importation, 35 l. 15 s. $3\frac{12}{100}$ d. and draw back, on exportation, 27 l. 5 s. $4\frac{8}{100}$ d. Portugal or madeira wine, the ton filled in casks, pays, on importation, 28 l. 8 s. $3\frac{12}{100}$ d. and, on exportation, draws back 20 l. 6 s. $4\frac{8}{100}$ d. in bottles, on importation, 31 l. 5 s. $3\frac{12}{100}$ d. and, on exportation, draws back 22 l. 15 s. $4\frac{8}{100}$ d. French wine, the ton filled in cask, on importation, pays 60 l. 16 s. $4\frac{8}{100}$ d. and, on exportation, draws back, 26 l. 2 s. $11\frac{12}{100}$ d. in bottles, on importation, 64 l. 5 s. $4\frac{8}{100}$ d. and, on exportation, draws back 27 l. 18 s. $8\frac{72}{100}$ d. Levant and all other wines, the ton filled in casks pay, on importation, 29 l. 4 s. $9\frac{12}{100}$ d. and, on exportation, draws back 21 l. 2 s. $10\frac{8}{100}$ d. in bottles, on importation, pays 32 l. 3 s. $9\frac{12}{100}$ d. and, on exportation, draws back, 23 l. 13 s. $10\frac{8}{100}$ d. Wines imported by British for private use. Rhenish, german, or hungary wine, the ton filled in casks, pays, on importation, 36 l. $3\frac{60}{100}$ d. and, on exportation, draws back 27 l. 5 s. $10\frac{80}{100}$ d. in bottles, on importation, the ton pays 36 l. 13 s. 6 d. and, on exportation, draws back 27 l. 17 s. 6 d. Portugal or madeira wine, the ton filled in casks, on importation, pays 29 l. 6 s. 6 d. and, on exportation, draws back 20 l. 18 s. 6 d. in bottles, on importation, 32 l. 3 s. 6 d. and, on exportation, draws back 23 l. 7 s. 6 d. French wine, the ton filled in casks, pays, on importation, 61 l. 8 s. 6 d. and, on exportation, draws back 26 l. 11 s. $\frac{40}{100}$ d. in bottles, on importation, 64 l. 17 s. 6 d. and, on exportation, draws back 28 l. 6 s. 10 d. Levant and all other wines, the ton filled in casks, pays, on importation, 30 l. 3 s. and, on exportation, draws back 21 l. 15 s. in bottles, on importation, 33 l. 2 s. and, on exportation, draws back 24 l. 6 s. And besides the afore-mentioned duties, all wines imported into the port of London, are to pay to the use of the orphans of the said city, for every ton, 4 s.

Wines imported by foreigners are to pay, besides the aforesaid duties, the under-mentioned, which must be added respectively to the duties payable by British. Rhenish, german or hungary wines, the ton filled in casks, on importation, pays 4 l. 8 s. $2\frac{40}{100}$ d. and, on exportation, draws back 4 l. 3 s. $2\frac{40}{100}$ d. in bottles, on importation, 4 l. 10 s. and, on exportation, draws back 4 l. 5 s. French wine, the ton in casks, pays, on importation, 4 l. 4s. $7\frac{20}{100}$ d. and, on exportation, draws back 3 l. 19 s. $7\frac{20}{100}$ d. in bottles, on importation, 4 l. 10 s. and, on exportation, draws back 4 l. 5 s. Le-

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vant and all other wines, filled in caſks, the ton pays, on importation, 4 l. 1 s. and, on exportation, draws back 3 l. 16 s. in bottles, on importation, 4 l. 10 s. and, on exportation, draws back 4 l. 5 s. And beſides thoſe duties, all wines of the growth of the Levant, imported into any port by foreigners, are to pay to the uſe of the town of Southampton, for every butt or pipe, 10 s.

Wine is alſo a denomination applied in medicine and pharmacy to divers mixtures and compoſitions wherein the juice of the grape is a principal ingredient. See the article Vinum.

With regard to the medical uſes of wines, it is obſerved, that among the great variety of wines in common uſe among us, five are employed in the ſhops as menſtrua for medicinal ſimples; that is, the vinum album hiſpanicum, or mountain wine; the vinum album gallicum, or french white wine; the canary wine, or ſack; the rheniſh wine; and the red port. The effects of theſe liquors on the human body, are to chear the ſpirits, warm the habit, promote perſpiration, render the veſſels full and turgid, raiſe the pulſe, and quicken the circulation. The effects of the full bodied wines are much more durable than thoſe of the thinner; all ſweet wines, as canary, abound with a glutinous, nutritious ſubſtance, whilſt the others are not nutrimental, or only accidentally ſo, by ſtrengthening the organs employed in digeſtion. Sweet wines, in general, do not paſs off freely by urine; and they heat the conſtitution more than an equal quantity of any other, though containing full as much ſpirit: red port, and moſt of the red wines, have an aſtringent quality, by which they ſtrengthen the tone of the ſtomach, and thus prove ſerviceable for reſtraining immoderate ſecretions; thoſe which are of an acid nature, as rheniſh, paſs freely by the kidneys, and gently looſen the belly. It is ſuppoſed that theſe laſt exaſperate and occaſion gouty calculous diſorders, and that new wines of every kind have this effect.

Wine-spirit, a term uſed by our diſtillers, and which may ſeem to mean the ſame thing with the phraſe of ſpirit of wine; but they are taken in very different ſenſes in the trade.

Spirit of wine is the name given to the common malt-ſpirit, when reduced to an alcohol, or totally inflammable ſtate; but the phraſe wine-ſpirit is uſed to expreſs a very clean and fine ſpirit, of the ordinary proof ſtrength, and made in England from wines of foreign growth. The way of producing it is by ſimple diſtillation, and it is never rectified any higher than common bubble proof. The ſeveral wines of different natures, yield very different proportions of ſpirit; but, in general, the ſtrongeſt yield one fourth, the weakeſt in ſpirits one eighth part of proof-ſpirit; that is, they contain from a ſixteenth to an eighth part of their quantity of pure alcohol.

Wines that are a little ſour, ſerve not at all the worſe for the purpoſes of the diſtiller, they rather give a greater vinoſity to the produce. This vinoſity is a thing of great uſe in the wine-ſpirit, whoſe principal uſe is to mix with another that is tartarized, or with a malt-ſpirit, rendered alkaline by the common method of rectification. All the wine-ſpirits made in England, even thoſe from the french wines, appear very greatly different from the common french brandy; and this has given our diſtillers a notion that there is ſome ſecret art practiſed in France, for the giving the agreeable flavour to that ſpirit; but this is without foundation. See the article Spirit.

Wine-press. See the article Press.

*Lees of* Wine. See the article Lees.

*Piece of* Wine. See the article Piece.

*Priſage of* Wine. See the article Prisage.

*Racking of* Wine. See Racking.

*Spirit of* Wine. See the article Spirit.

*Stooming of* Wine. See Stooming.

WING, *ala*, that part of a bird, inſect, &c. whereby it is enabled to fly. See the articles Flying, Feather, &c.

Willoughby obſerves, that all birds whatſoever have wings, or rudiments of wings, which anſwer to the fore legs in quadrupeds. Among land-fowl he obſerves, that the oſtrich, caſſowary, and dodo; and among water-fowl, the pengune, have wings altogether uſeleſs and unfit for flight. See the articles Ornithology, Ostrich, &c.

Inſects, indeed, have wings, and ſo have bats, but of a different kind from thoſe of birds; the former being membranaceous, and the latter cutaneous: birds only have wings made up of feathers. All birds, towards the extremity of their wings, have a certain finger-like appendix, which is commonly called the ſecundary or baſtard-wing. It is made up of four or five ſmall feathers. Beſides this under the wing, or on the inſide of the wing,

wing, ſome birds, eſpecially water-fowl, have a row of feathers growing, called interior baſtard wing, which in moſt birds is of a white colour. See the articles INSECT, BAT, &c.

Reaumur obſerves, that wings among the fly-claſs, afford ſeveral ſubordinate diſtinctions of the genera of thoſe animals, under the antient general claſſes. Several ſpecies of flies, while they are in a ſtate of reſt, or only walking, ſhew ſeveral regularly diſtinct manners of carrying their wings. The much greater number, however, carry them in a parallel or plain poſition. Among thoſe who carry them thus, ſome have them in form of a ſort of ores, their direction being perpendicular to the length of the body, which is not at all covered by them. Others carry their wings in this manner, ſo as that they cover a part of the body, without at all covering one another, The wings of others croſs one another on the body of the creature, and the degrees in which they cover one another, give occaſion to ſeveral other ſub-diſtinctions; for ſome of them over-hang on each ſide the body of the animal, while others croſs one another, in ſuch a manner as not to cover the body of the fly entirely, but leave a rim of it viſible and uncovered on each ſide of them. Some of the flies bred of water-worms, have their wings in this manner. Others have their wings thus diſpoſed, but croſſing one another only in a part of their ſurface, and that at their extremities; ſo that though they there cover the body of the fly, they leave a portion of the anterior part of the body naked. See the article FLY.

The beautiful wings of butterflies are diſtinguiſhed from thoſe of the fly-kind, by their not being thin and tranſparent, like them, but thicker and opake. This opacity in them is only owing to the duſt which comes off them, and ſticks to the fingers in handling them; and it is alſo to this duſt that they owe all their beautiful variety of colours. The earlier naturaliſts, for this reaſon, diſtinguiſhed theſe inſects by the appellation of ſuch as had farinaceous wings.

The wings of gnats are of a very curious ſtructure, and well worthy the uſe of the microſcope, to ſee them diſtinctly. It is well known, that on touching the wings of butterflies, a coloured powder is left on the fingers, which, though to the naked eye it appears a mere ſhapeleſs duſt, yet when examined by the microſcope, it is found to be very regularly figured beautiful bodies, in form of feathers and ſcales: theſe are of various figures, and all of them very elegant. The generality of flies have nothing of this kind; but the cloſe examination of the wings of the gnat will ſhew, that they are not wholly deſtitute of them: they are much more ſparingly beſtowed, indeed, upon the gnat than on the butterfly; but then they are arranged with great regularity.

WINGS, in heraldry, are borne ſometimes ſingle, ſometimes in pairs; in which caſe they are called conjoined. When the points are downward, they are ſaid to be inverted; when up, elevated. See VOL.

WING, in botany, the angle formed between the ſtem and the leaves or pedicles of the leaves of a plant. See the article LEAF, &c.

WINGS, *alæ*, in military affairs, are the two flanks or extremes of an army, ranged in form of a battle; being the right and left ſides thereof. See the articles ARMY, BATTALION, &c.

WINGS, in fortification, denote the longer ſides of horn works, crown-works, tenailles, and the like out-works; including the ramparts and parapets, with which they are bounded on the right and left from their gorge to their front.

WINGED, in botany, a term applied to ſuch ſtems of plants as are furniſhed all their length with a ſort of membraneous leaves, as the thiſtle, &c.

Winged leaves, are ſuch as conſiſt of divers little leaves, ranged in the ſame direction, ſo as to appear only as the ſame leaf. Such are the leaves of agrimony, acacia, aſh, &c. See the article LEAF.

Winged ſeeds, are ſuch as have down or hairs on them, which, by the help of the wind, are carried to a diſtance. See the article SEED.

WINNOW, ſignifies to fan or ſeparate corn from the chaff by the wind.

WINOXBERG, a town of the French Netherlands, in the province of Flanders, ſituated on the river Colme, five miles ſouth of Dunkirk.

WINSCHOTEN, a town of the United Provinces, in the province of Groningen, ſituated ſixteen miles ſouth eaſt of Groningen.

WINSEN, a town of Germany, in the circle of Lower Saxony, and dutchy of Lunenburg,

Lunenburg, situated at the confluence of the river Elbe and Ilmenau, fifteen miles north-west of Lunenburg.

WINSLOW, a market-town of Bucks, six miles north of Ailesbury.

WINSTER, a market-town of Darbyshire, situated ten miles north of Darby.

WINTER, one of the four seasons or quarters of the year. See SEASON, &c.

Winter commences on the day when the sun's distance from the zenith of the place is greatest, and ends on the day when its distance is at a mean between the greatest and least. See the articles SUN and EARTH.

Notwithstanding the coldness of the season, it is proved by astronomers, that the sun is really nearer the earth in winter than in summer; the reason of the decay of heat, and the truth of this proposition, see explained under the articles HEAT, LIGHT, EARTH, &c.

Under the equator, the winter as well as other seasons, return twice every year; but all other places have only one winter in the year, which in the northern hemisphere begins when the sun is in the tropic of capricorn, and in the southern hemisphere when in the tropic of cancer; so that all places in the same hemisphere have their winter at the same time. See the article TROPIC.

WINTER, among printers, that part of the printing-press serving to sustain the carriage. See PRINTING-PRESS.

WINTER'S BARK, *cortex winteranus*, in botany, a name given to the bark of the white or wild cinnamon tree. See the article CINNAMON.

The winter's bark is a thick and firm bark, though we have a different thing sometimes under its name: it comes to us rolled up in the manner of the common cinnamon, into a kind of tubes or pipes; but they are usually thicker, and always shorter than the fine tubes of cinnamon. It is externally of a greyish colour, and of a reddish brown within; it is properly, indeed, a double bark, the outer and inner of the same tree, not the inner bark alone, separated from the other, as the cinnamon and cassia are. The outer rind is of an uneven surface and of a loose texture, very brittle and easily powdered. The inner bark, which has the principal virtue, is hard, and of a dusky reddish brown. The outer one is often cracked and open in several places, the inner one never in any. It is of an extremely fragrant and aromatic smell, and of a sharp, pungent, and aromatic taste, much hotter than cinnamon in the mouth, and leaving a more lasting flavour in it.

It is to be chosen in pieces not too large, with the inner or brown part sound and firm, and of a very sharp taste. It is apt to be worm-eaten; but in that case it is wholly to be rejected, as having lost the far greater part of its virtue.

The cortex winteranus was wholly unknown to the antients; the discovery of it among us is owing to captain Winter, who, in the year 1567, going as far as the streights of Magellan with Sir Francis Drake, found this bark on that coast, and bringing a large quantity of it with him in his return to England, it became used in medicine, and was ever after called by his name. It is not, however, peculiar to the place he found it in, but is frequent in many parts of America.

The virtues of this bark were discovered by the english sailors on board captain Winter's ship; they first used it by way of spice to their foods, and afterwards for the scurvy. It is also good in palsies and rheumatisms; and a decoction of the leaves is good by way of fomentation, for the parts externally affected by the scurvy. The english sailors made it famous for its virtues against the poison of a certain fish, common about the Magellanic sea, and which they called the sea-lion. They ate the flesh of this fish, and fell into many illnesses by it, among which was one attended with a peeling off the skin of their whole bodies, not without excessive pain; this they remedied by the cortex winteranus; but by the accounts we have of the effects of eating this fish, as it is called, they were rather symptoms of an inveterate scurvy, and, therefore, it is no wonder this bark did them great service.

WINTER-QUARTERS. See QUARTERS.

WINTER-RIG, among husbandmen, signifies to fallow or till the land in winter. See the article FALLOW.

WINTER-SOLSTICE. See SOLSTICE.

WINTERTONNESSE, the north cape of the county of Norfolk, four miles north of Yarmouth.

WINTSHEIM, a town of Germany, in the circle of Franconia, and marquisate of Anspach, situated fifteen miles north of Anspach.

WIRE, WIAR, WIER, WYRE, a piece of

of metal drawn through the hole of an iron into a thread of a finenefs anfwerable to the hole it paffed through.

Wires are frequently drawn fo fine, as to be wrought along with other threads of filk, wool, flax, &c.

The metals moft commonly drawn into wire, are gold, filver, copper, and iron. Gold-wire is made of cylindrical ingots of filver, covered over with a fkin of gold, and thus drawn fucceffively through a vaft number of holes, each fmaller and fmaller; till at laft it is brought to a finenefs exceeding that of a hair. That admirable ductility which makes one of the diftinguifhing characters of gold, is no where more confpicuous, than in this gilt wire. A cylinder of forty-eight ounces of filver, covered with a coat of gold, only weighing one ounce, as Dr. Halley informs us, is ufually drawn into a wire, two yards of which weigh no more than one grain; whence ninety-eight yards of the wire weigh no more than forty-nine grains, and one fingle grain of gold covers the ninety-eight yards; fo that the ten thoufandth part of a grain is above one-eighth of an inch long. The fame author computing the thicknefs of the fkin of gold, found it to be $\frac{1}{134500}$ part of an inch. Yet fo perfectly does it cover the filver, that even a microfcope does not difcover any appearance of the filver underneath. M. Rohault likewife obferves, that a like cylinder of filver, covered with gold, two feet eight inches long, and two inches nine lines in circumference, is drawn into a wire 307200 feet long, *i. e.* into 115200 times its former length. Mr. Boyle relates, that eight grains of gold, covering a cylinder of filver, is commonly drawn into a wire 13000 feet long. See the articles GOLD and DUCTILITY.

Silver-wire is the fame with gold-wire, except that the latter is gilt, or covered with gold, and the other is not.

There are alfo counterfeit gold and filver-wires; the firft made of a cylinder of copper filvered over, and then covered with gold; and the fecond of a like cylinder of copper, filvered over, and drawn through the iron, after the fame manner as gold and filver wire.

Brafs-wire is drawn after the fame manner as the former. Of this there are divers fizes, fuited to the different kinds of works. The fineft is ufed for the ftrings of mufical inftruments, as fpinets, harpfichords, manichords, &c. See the article SPINET, &c.

The pin-makers, likewife, ufe vaft quantities of brafs-wire, to make their pins of.

Iron-wire is drawn of various fizes, from half an inch to one tenth of an inch diameter.

The firft iron that runs from the ftone, when melting, being the fofteft and tougheft, is preferved to make wire of. Iron-wire is made from fmall bars of iron called effeom-iron, which are firft drawn out to a greater length, and to about the thicknefs of one's little finger, at a furnace, with a hammer gently moved by water. Thefe thinner pieces are bored round, and put into a furnace to aneal for twelve hours. A pretty ftrong fire is ufed for this operation. After this they are laid under water for three or four months, the longer the better; then they are delivered to the workmen, called rippers, who draw them into wire thro' two or three holes. After this they aneal them again for fix hours, and water them a fecond time for about a week, and they are then delivered again to the rippers, who draw them into wire of the thicknefs of a large packthread. They are then anealed a third time, and then watered for a week longer, and delivered to the fmall wire-drawers, called overhoufe-men.

In the mill where this work is performed, there are feveral barrels hooped with iron, which have two hoops on their upper fides, on each whereof hang two links which ftand acrofs, and are faftened to the two ends of the tongs, which catch hold of the wire, and draw it through the hole. The axis on which the barrel moves does not run through the center, but is placed on one fide, which is that on which the hooks are placed; and underneath there is faftened to the barrel a fpoke of wood, which they call a fwingle, which is drawn back a good way by the cogs in the axis of the wheel, and draws back the barrel, which falls to again by its own weight. The tongs hanging on the hooks of the barrel, are by the workmen faftened to the end of the wire, and by the force of the wheel, the hooks being pulled back, draw the wire through the holes. The plate in which the holes are, is iron on the outfide, and fteel on the infide; and the wire is anointed with train-oil, to make it run the eafier.

WIRE *of Lapland*. The inhabitants of Lapland have a ſort of ſhining ſlender ſubſtance in uſe among them on ſeveral occaſions, which is much of the thickneſs and appearance of our ſilver-wire, and is therefore called, by thoſe who do not examine its ſtructure or ſubſtance, lapland-wire. It is made of the ſinews of the rein-deer, which being carefully ſeparated in the eating, are, by the women, after ſoaking in water, and beating, ſpun into a ſort of thread, of admirable fineneſs, and ſtrength, when wrought to the ſmalleſt filaments; but when larger, is very ſtrong, and fit for the purpoſes of ſtrength and force. Their wire, as it is called, is made of the fineſt of theſe threads, covered with tin. The women do this buſineſs, and the way they take is to melt a piece of tin, and placing at the edge of it a horn with a hole through it, they draw theſe ſinewy threads, covered with the tin, through the hole, which prevents their coming out too thick covered. This drawing is performed with their teeth; and there is a ſmall piece of bone placed at the top of the hole, where the wire is made flat, ſo that we always find it rounded on all ſides but one, where it is flat.

This wire they uſe in embroidering their cloaths as we do gold and ſilver; they often ſell it to ſtrangers, under the notion of its having certain magical virtues.

WIRKSWORTH, a market-town of Darbyſhire, ſituated ſix miles north of Darby.

WISBEACH, a market-town of the iſle of Ely, in Cambridgeſhire, ſituated fifteen miles north of Ely.

WISLEY, a port-town of Sweden, ſituated on the weſt coaſt of the iſland of Gothland, one hundred and ten miles ſouth of Stockholm.

WISDOM, *ſapientia*, uſually denotes a higher and more refined notion of things immediately preſented to the mind, as it were, by intuition, without the aſſiſtance of ratiocination. See UNDERSTANDING, REASON, KNOWLEDGE, *&c.*

In this ſenſe wiſdom may be ſaid to be a faculty of the mind, or at leaſt a modification and habit thereof. See FACULTY, MODIFICATION, HABIT, *&c.*

Sometimes the word is more immediately uſed, in a moral ſenſe, for what we call prudence, or diſcretion, which conſiſts in the ſoundneſs of the judgment, and a conduct anſwerable thereto.

WISMAR, a town of Germany, in the circle of lower Saxony, and dutchy of Mecklenburg, ſituated on a bay of the Baltic-ſea, twelve miles north of Swerin.

WISSELOCK, a town of Germany, in the palatinate of the Rhine, ſituated ſeven miles ſouth of Heidelburg.

WISTON, a market-town of Pembrokeſhire, ſituated ten miles north of Pembroke.

WIT, a faculty of the mind, conſiſting, according to Mr. Locke, in the aſſembling and putting together of thoſe ideas, with quickneſs and variety, in which any reſemblance or congruity can be found, in order to form pleaſant pictures and agreeable viſions to the fancy. This faculty, the ſame author obſerves, is juſt the contrary of judgment, which conſiſts in the ſeparating carefully from one another, ſuch ideas wherein can be found the leaſt difference, thereby to avoid being miſled by ſimilitude and affinity, to take one thing for another. It is the metaphor and alluſion, wherein, for the moſt part, lies the entertainment and pleaſantry of wit, which ſtrikes ſo lively on the fancy, and is therefore ſo acceptable to all people, becauſe its beauty appears at firſt ſight, and there is required no labour of thought to examine what truth or reaſon there is in it. The mind without looking any farther, reſts ſatisfied with the agreeableneſs of the picture, and the gaiety of the imagination; and it is a kind of affront to go about to examine it by the ſevere rules of truth or reaſon. See the article IMAGINATION, *&c.*

Wit is alſo an appellation given to the perſon poſſeſſed of this faculty; and here the true wit muſt have a quick ſucceſſion of pertinent ideas, and the ability of arranging and expreſſing them in a lively and entertaining manner; he muſt at the ſame time have a great deal of energy and delicacy in his ſentiments; his imagination muſt be ſprightly and agreeable, without any thing of parade or vanity in his diſcourſe: but it is not, however, eſſential to the character of a wit, to be ever hunting after the brilliant, ſtudying ſprightly turns, and affecting to ſay nothing but what may ſtrike and ſurprize. See the article FACULTY, *&c.*

WITCHCRAFT, a kind of ſorcery, eſpecially in women, in which it is ridiculouſly ſuppoſed that an old woman, by entering into a contract with the devil, is enabled, in many inſtances, to change the

the courſe of nature; to raiſe winds; perform actions that require more than human ſtrength; and to afflict thoſe who offend them with the ſharpeſt pains, *&c.* In the times of ignorance and ſuperſtition, many ſevere laws were made againſt witches, by which great numbers of innocent perſons, diſtreſſed with poverty and age, were brought to a violent death; but theſe are now happily repealed.

WITENA-MOT, or WITENA-GEMOT, among our ſaxon anceſtors, was a term which literally ſignified the aſſembly of the wiſe men, and was applied to the great council of the nation, of latter days called the parliament.

WITEPSKI, the capital of the palatinate of the ſame name, in the dutchy of Lithuania, in Poland: eaſt long. 30°, north lat. 56°.

WITHAM, a market-town of Eſſex, ten miles north-eaſt of Chelmsford.

WITHERNAM, in law, a writ that lies where a diſtreſs is driven out of the county, and the ſheriff cannot make deliverance to the party diſtrained; in that caſe this writ is directed to the ſheriff, commanding him to take as many of the beaſts, or goods, of the party into his keeping till he make deliverance of the firſt diſtreſs.

WITHERS of a horſe, the juncture of the ſhoulder-bones at the bottom of the neck and main, towards the upper part of the ſhoulder.

WITNESS, in law, a perſon who gives evidence in any cauſe, and is ſworn to ſpeak the truth, the whole truth, and nothing but the truth.

A witneſs ought to be indifferent with reſpect to each party; for if he will be a gainer or loſer by the ſuit, he is not ſworn as a witneſs. See EVIDENCE.

Falſe witneſſes, ſuborners of witneſſes, *&c.* are in England puniſhed with the pillory; in ſeveral other countries with death. See the articles PERJURY, SUBORDINATION, *&c.*

WITNEY, a market-town of Oxfordſhire, ſeven miles weſt of Oxford. Here is the greateſt manufacture of blankets in England.

WITTENBURG, a city of Germany, in the circle of Upper Saxony, fifty miles north of Dreſden.

WITTENBURG, is alſo a town of Germany, in the marquiſate of Brandenburg, ſixty miles north of the city of Brandenburg.

WITTLESEYMERE, a lake in the iſle of Ely, on the confines of Huntingdonſhire, ſix miles long and three broad.

WITTIMUND, a town of Germany, in the circle of Weſtphalia, fifteen miles north of Embden.

WIVELSCOMB, a market-town of Somerſetſhire, ſituated twenty-ſeven miles ſouth-weſt of Wells.

WOAD, *iſatis*, in botany. See ISATIS. This is a drug uſed by the dyers to give a blue colour. It ariſes from ſeed ſown annually in the ſpring, which puts forth leaves reſembling thoſe of rib-wort plantain. Theſe plants have uſually three, four, or five crops of leaves every year, of which the firſt is the beſt, and the reſt in their order. When the leaves are ripe, they gather them, and carry them to a woad mill to grind them ſmall; after which they are laid eight or ten days on heaps, and are at length made into a kind of balls, which are laid in the ſhade on hurdles to dry. This done, they break or grind them to powder; which is then ſpread on a floor and watered. Here they let it ſmoak and heat, till by torrifying it every day it becomes quite dry.

A woad-blue is a very deep blue, almoſt black; and is the baſe of ſo many ſorts of colours, that the dyers have a ſcale by which they compoſe the ſeveral caſts or degrees of woad, from the brighteſt to the deepeſt.

WOBURN, a market-town of Bedfordſhire, ten miles ſouth of Bedford.

WOERDEN, a town of the United Provinces, in the province of Holland, eighteen miles ſouth of Amſterdam.

WOLAW, the capital of a dutchy of the ſame name, in Bohemia: eaſt long. 16° 38′, north lat. 51° 22′.

WOLD, ſignifies a plain down, or open champaign ground, hilly and void of wood.

WOLD, or WELD, among dyers. See the article WELD.

WOLF, *lupus*, in zoology, the canis, with the tail bending inward. See CANIS.

The wolf is a very large and a very fierce animal, being equal to the biggeſt maſtiff in ſize, and having much of the general appearance of that creature: the head is large and fleſhy: the eyes are large and prominent, and their iris hazel: the ears are ſhort, patulous, and erect: the teeth are very large, and the animal has a way of ſhewing them in a frightful manner, by grinning: the neck

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is robuft and thick: the body is large, and the back broad: the legs are very robuft; the tail is long and bufhy: the natural colour is black, but there are fome tawny; and in fome places they are in winter perfectly white. The wolf is a very mifchievous creature, deftroying cattle; and in hard winters attacking houfes and villages in whole troops.

*Sea*-WOLF, in ichthyology. See the article LUPUS.

WOLFEMBUTTLE, a city of Germany, in the circle of lower Saxony, and dutchy of Brunfwick: eaft long 10° 32′, north lat. 52° 20′.

WOLFERDYKE, an ifland of the united Netherlands, in the province of Zealand, fituated between the iflands of north Beveland and fouth Beveland.

WOLFESHEAD, or WOLFERHEFOD, denoted the condition of fuch perfons as were outlawed in the time of the Saxons; who, if they could not be taken alive, fo as to be brought to juftice, might be flain, and their heads brought to the king; for the head of one of thefe was no more accounted of than a wolf's head. See the article OUTLAWRY.

WOLGA, a large river of Ruffia, which rifing in the north of that empire, runs fouth-eaft till it falls into the Cafpian-fea, about fifty miles below Aftracan, after its having run a courfe of between two and three thoufand miles.

WOLGAST, a city and port-town of Germany, in the circle of Upper Saxony, and dutchy of Pomerania, fubject to Sweden: eaft long. 14° 5′, north lat. 54° 12′.

WOLKOWSKA, a city of Poland, in the dutchy of Lithuania, and palatinate of Novogrodeck: eaft long. 24°, north lat. 53°.

WOLLIN, a town and ifland of Pomerania, fituated in the Baltic-fea, at the mouth of the river Oder, fubject to the king of Pruffia.

WOLODOMIR, the capital of a province of the fame name in Ruffia: eaft long. 30° 5′, north lat. 57° 40′.

WOLOGDA, the capital of a province of the fame name in Ruffia, fituated on the river Dwina: eaft long. 42° 20′, north lat. 59°.

WOLVERHAMPTON, a market-town of Staffordfhire, eleven miles fouth of Stafford.

WOLVES TEETH, of an horfe, are overgrown grinders, the points of which being higher than the reft, prick his tongue and gums in feeding, fo as to hinder his chewing. They are feldom met with in any befides young horfes; but if they be not daily worn by chewing, they will grow up even to pierce the roof of the mouth.

WOMAN, *fœmina*, in zoology, the female of man. See the article MAN.

Women, from the very frame and conftitution of their bodies, are liable to feveral difeafes, which are peculiar to that fex, arifing from a fuppreffion or immoderate flux of the menfes, from pregnancy, delivery, their milk, *&c.* all which may be found under their feveral articles; as MENSES, FLUOR ALBUS, ABORTION, MILK, *&c.*

For the englifh laws in relation to women, fee the articles COVERTURE, BARON *and feme*, PARAPHERNALIA, WIFE, *&c.*

WOMB, *uterus*. See UTERUS.

WONDER. See the article MIRACLE.

The feven wonders of the world, as they are popularly called, were the egyptian pyramids; the maufoleum, erected by Artemefia; the temple of Diana, at Ephefus; the walls and hanging gardens of the city of Babylon; the coloffus, or brazen image of the fun, at Rhodes; the ftatue of Jupiter Olympius; and the pharos, or watch-tower, of Ptolemy Philadelphus. See PYRAMID, MAUSOLEUM, COLOSSUS, PHAROS, *&c.*

WOOD, *lignum*, a folid fubftance, whereof the trunks and branches of trees confift. See the articles TREE, TRUNK, BRANCH, UNDERWOOD, *&c.*

The wood is all that part of a tree included between the bark and the pith. See the article BARK.

Dr. Grew, in his Anatomy of Plants, has difcovered, by means of the microfcope, that what we call wood in a vegetable, notwithftanding all its folidity, is only an affemblage of infinite minute canals, or hollow fibres, fome of which rife from the root upwards, and are difpofed in form of a circle; and the others, which he calls infertions, tend horizontally from the furface to the center; fo that they crofs each other, and are interwoven like the threads of a weaver's web. See VEGETATION, SAP, *&c.*

Notwithftanding this, M. Buffon obferves, that the organization of wood is yet unknown in all its parts; and that though the world is greatly indebted to the obfervations of Grew, Malpighi, and Hales, yet when he entered on the

 fubject,

ſubject, he found there was much more unknown than known; and determined to obſerve, from its firſt ſtate, the growth of trees, and the formation of their woody part. For this ingenious author's expoſition of the texture, &c. of wood, and thence his calculation of the force and ſtrength of timber uſed in building, we muſt refer the reader to his paper upon that ſubject, as publiſhed in the Memoirs Acad. Par. for the year 1740, and to what has been ſaid under the article TIMBER.

Mortimer obſerves that all kinds of wood are to be preſerved from the worm, and from many other occaſions of decay, by oily ſubſtances, particularly the eſſential oils of vegetables. Oil of ſpike is excellent; and oil of juniper, turpentine, or any other of this kind, will ſerve the purpoſe; theſe will preſerve tables, inſtruments, &c. from being eaten to pieces by theſe vermin; and linſeed-oil will ſerve, in many caſes, to the ſame purpoſe; probably nut-oil will do alſo, and this is a ſweeter oil, and a better varniſh for wood.

Some of the weſt-indian trees afford a ſort of timber which, if it would anſwer in point of ſize, would have great advantages over any of the european wood in ſhip building for the merchant-ſervice, no worm ever touching this timber. The acajou, or tree which produces the caſhew-nut, is of this kind; and there is a tree of Jamaica, known by the name of the white-wood, which has exactly the ſame property; and ſo have many other of their trees.

To ſeaſon wood expeditiouſly for ſea-ſervice, Mr. Boyle obſerves, that it has been uſual to bake it in ovens.

The art of moulding wood is mentioned by Mr. Boyle as a deſideratum in the art of carving. He ſays, he had been credibly informed of its having been practiſed at the Hague; and ſuſpects that it might have been performed by ſome menſtruum that ſoftens the wood, and afterwards allows it to harden again, in the manner that tortoiſe-ſhell is moulded: or, perhaps, by reducing the wood into a powder, and then uniting it into a maſs with ſtrong but thin glue. And he adds, that having mixed ſaw-duſt with a fine glue made of iſing-glaſs, ſlightly ſtraining out what was ſuperfluous through a piece of linen, the remainder, formed into a ball and dried, became ſo hard as to rebound when thrown againſt the floor.

The people who work much in wood, and that about ſmall works, find a very ſurpriſing difference in it, according to the different ſeaſons at which the tree was cut down, and that not regularly the ſame in regard to all ſpecies, but different in regard to each. The button-mould makers find that the wood of the pear-tree, cut in ſummer, works tougheſt; holly, on the contrary, works tougheſt when cut in winter; box is melloweſt when it has been cut in ſummer, but hardeſt when cut about Eaſter; haw-thorn works mellow when cut about October, and the ſervice is always tough, if cut in ſummer.

Wood uſed for fuel is required of various kinds, in regard to the various works to be performed by it.

Neri every where commends oak for the wood to be burnt in the glaſs-houſes, as the propereſt wood for making a ſtrong and durable fire with a good flame.

Imperato, on the contrary, recommends aſh on the ſame occaſion; becauſe as he ſays it gives a ſubſtantial, rather than a great flame: and Camerarius deſervedly commends juniper-wood, as affording a laſting, ſtrong, and ſweet fire, could plenty of it be had. Among the antients, Pliny commends light dry wood; and Plutarch, the tameriſk in particular, for making the glaſs houſe-fires; but glaſs-making requires ſo great a fire as cannot be eaſily made from ſuch wood. Nor can aſh be proper, becauſe, though it gives a good fire, it ſoon decays.

Woods are diſtinguiſhed into divers kinds, with regard to their nature, properties, virtues, and uſes. Of wood, conſidered according to its qualities, whether uſeful, curious, medicinal, &c. the principal is called timber, uſed in building houſes, laying floors, roofs, machines, &c. See the article TIMBER.

Woods valued on account of their curioſity are cedar, ebony, box, calambo, &c. which by reaſon of their extraordinary hardneſs, agreeable ſmell, or beautiful poliſh, are made into tables, combs, beads, &c. See the article EBONY, &c.

The medicinal woods are guaiacum, aloes, ſaſſafras, nephriticum, ſantal, ſarſaparilla, aſpalathum, &c. See GUAIACUM, ALOES, SASSAFRAS, &c.

Woods uſed in dying are the indian-wood, brazil wood, campechy wood, &c.

&c. See the article BRAZIL, &c.

*Fossile* WOOD. Fossile wood, or whole trees, or parts of them, are very frequently found buried in the earth, and that in different strata; sometimes in stone, but more usually in earth; and sometimes in small pieces loose among gravel. These, according to the time they have lain in the earth, or the matter they have lain among, and in the way of, are found differently altered from their original state; some of them having suffered very little change, and others being so highly impregnated with crystalline, sparry, pyritical, or other extraneous matter, as to appear mere masses of stone, or lumps of the common matter of the pyrites, &c. of the dimensions, and, more or less, of the internal figure of the vegetable bodies into the pores of which they have made their way.

The fossile-wood, which we find at this day, are, according to these differences, arranged, by Dr. Hill, into three kinds; 1. the less altered: 2. the pyritical: and, 3. the petrified.

Of the trees, or parts of them, less altered from their original state, the greatest store is found in digging to small depths in bogs, and among what is called peat or turf-earth, a substance used in many parts of the kingdom for fuel. In diging among this, usually very near the surface, they find immense quantities of vegetable matter buried, and that of various kinds: in some places there are whole trees scarce altered, except in colour; the oaks in particular being usually turned to a jetty black; the pines and firs, which are also very frequent, are less altered, and are as inflammable as ever, and often contain, between the bark and wood, a black resin. Large parts of trees have also been not unfrequently met with unaltered in beds of another kind, and at much greater depths, as in the strata of clay and loam, among gravel, and sometimes even in solid stone.

Besides these harder parts of trees, there are frequently found also in the peat-earth, vast quantities of the leaves and fruit, and catkins of the hazel, and the like trees: these are usually intermixed among the sedge and roots of grass, and are scarce at all altered from their usual texture. The most common of these are hazel nuts; but there are frequently found also the twigs and leaves of the white poplar; and a little deeper usually there lies a cracked and shattered wood, the crevices of which are full of a bituminous black matter; and among this the stones of plumbs, and other stone-fruits, are sometimes found, but that more rarely.

It is idle to imagine, that these have been thus buried either at the creation; or, as many are fond of believing, at the universal deluge: at the first of these times the strata must have been formed before the trees were yet in being; and the peat-wood is so far from being of antedeluvian date, that much of it is well known to have been growing within these three hundred years, in the very places where it is now found buried.

In this state, that is little altered from their original condition, it is, that the fruits, and larger parts of trees are usually found: what we find of them more altered, are sometimes large and long, sometimes smaller and shorter, branches of trees; sometimes small fragments of branches and more frequently small shapeless pieces of wood. The larger and longer branches are usually found bedded in the strata of stone, and are more or less altered into the nature of the stratum they lie in: the shorter and smaller branches are found in vast variety in the strata of blue clay, used for making tiles in the neighbourhood of London; these are prodigiously plentiful in all the clay-pits of this kind, and usually carry the whole external resemblance of what they once were, but nothing of the inner structure; their pores being wholly filled, and undistinguishably closed by the matter of the common vitriolic pyrites, so as to appear mere simple masses of that matter. These fall to pieces on being long exposed to a moisture, and are so pregnant in vitriol that they are what is principally used for making the green vitriol or copperas at Deptford, and other places. See the articles VITRIOL and COPPERAS.

The irregular masses or fragments of wood, are principally of oak, and are most usually found among gravel; tho' sometimes in other strata. These are variously altered by the insinuation of crystalline and stony particles, and make a very beautiful figure when cut and polished, as they usually keep the regular grain of the wood, and shew exactly the several circles which mark the different years growth. These, according to the

the different matter which has filled their pores, aſſume various colours, and the appearance of the various foſſils that have impregnated them; ſome are perfectly white, and but moderately hard; others of a browniſh black, or perfectly black, and much harder; others of a reddiſh black, others yellowiſh, and others greyiſh, and ſome of a ferrugineous colour. They are of different weights alſo and hardneſſes, according to the nature and quantity of the ſtony particles they contain: of theſe ſome pieces have been found with every pore filled with pure pellucid cryſtal; and others in large maſſes, part of which is wholly petrified and ſeems mere ſtone, while the reſt is crumbly and is unaltered wood.

That this alteration is made in wood, even at this time, is alſo abundantly proved by the inſtances of wood being put into the hollows of mines, as props and ſupports to the roofs, which is found after a number of years as truly petrified as that which is dug up from the natural ſtrata of the earth. In the pieces of petrified wood found in Germany, there are frequently veins of ſpar or of pure cryſtal, ſometimes of earthy ſubſtances, and often of the matter of the common pebbles: theſe fragments of wood ſometimes have the appearance of parts of the branches of trees in their natural ſtate; but more frequently they reſemble pieces of broken boards; theſe are uſually capable of a high and elegant poliſh.

Many ſubſtances, it is certain, have been preſerved in the cabinets of collectors, under the title of petrified wood, which have very little right to that name. But where the whole outer figure of the wood, the exact lineaments of the bark, or the fibroſe or fiſtular texture of the ſtriæ, and the veſtiges of the utriculi and tracheæ, or air-veſſels, are yet remaining, and the ſeveral circles yet viſible, which denoted the ſeveral years growth of the tree, none can deny theſe ſubſtances to be real foſſil wood.

*Cord of* Wood. See Cord *of Wood.*

*Cutting in* Wood, is uſed for various purpoſes; as for initial and figured letters, head and tail-pieces of books; and even for ſchemes, mathematical and other figures, to ſave the expence of engraving on copper: and for prints, and ſtamps for papers, calicoes, linens, *&c.*

The invention of cutting in wood, as well as that in copper, is aſcribed to a goldſmith of Florence; but Albert Durer and Lucas brought both theſe arts to perfection.

About 200 years ago, the art of cutting in wood was carried to a very great pitch, and might even vie, for beauty and juſtneſs, with that of engraving on copper: at preſent it is much neglected, the application of artiſts being wholly employed on copper, as the more eaſy and promiſing province: not but that wooden cuts have the advantage of thoſe in copper in many reſpects; chiefly for figures and devices in books; as being printed at the ſame time and in the ſame preſs with the letters: whereas, for the other, there is required a particular and ſeparate impreſſion.

The cutters in wood begin with preparing a plank or block of the ſize and thickneſs required, and very even and ſmooth on the ſide to be cut: for this they uſually take pear-tree, or box; but the latter is beſt, as being cloſeſt, and leaſt liable to be worm eaten. On this block they draw their deſign with a pen or pencil, exactly as they would have it printed; or they faſten the deſign drawn on paper upon the block with paſte and a little vinegar, the ſtrokes or lines turned towards the wood. When the paper is dry, they waſh it gently with a ſponge dipped in water, and then take it off by little and little, rubbing it firſt with the tip of the finger, till nothing is left on the block but the ſtrokes of ink that form the deſign, which mark out what part of the block is to be ſpared or left ſtanding. The reſt they cut off very carefully with the points of very ſharp knives, chiſſels, or gravers, according to the bigneſs or delicacy of the work.

*Meaſure of* Wood. See Measure.

*Painting on* Wood, *&c.* See the article Painting, *&c.*

Wood, *ſylva*, in geography, a multitude of trees extended over a large continued tract of land, and propagated without culture. The generality of woods only conſiſt of trees of one kind.

The antient Saxons had ſuch a veneration for woods, that they made them ſanctuaries.

It is ordained, that none ſhall deſtroy any wood, by turning it into tillage or paſture, *&c.* where there are two acres or more in quantity, on pain of forfeiting 40 s. an acre, by 35 Hen. VIII. *c.* 17. All woods that are felled at fourteen years growth, are to be preſerved from deſtruction for eight years; and no cattle

cattle put into the ground till five years after the felling thereof, &c. 13 Eliz. c. 25. The burning of woods, or underwood, is declared to be felony; alſo thoſe perſons that maliciouſly cut or ſpoil timber trees, or any fruit-trees, &c. ſhall be ſent to the houſe of correction, there to be kept three months, and whipt once a month.

WOODBRIDGE, a market-town of Suffolk, ſituated twenty-ſix miles ſouth-eaſt of Bury.

WOOD COCK, *ſcolopax*, in ornithology. See the article SCOLOPAX.

WOOD COCK SHELL, in natural hiſtory, the variegated yellowiſh purpura, with tubercles, and a long beak; and the thorny wood-cock-ſhell is the yellow long beaked purpura, with long and crooked ſpines. See PURPURA.

WOOD-CORN, is ſaid to be corn given by the tenants of ſome manors to the lords for the liberty to gather up wood, and the feeding of cattle, there.

WOOD COPPICE. See COPPICE.

WOOD and WOOD, in the ſea-language, is when two pieces of timber are ſo let into each other, that the wood of the one joins cloſe to the other.

WOOD-GELD, or WOODGELDUM, in our antient cuſtoms, the gathering or cutting of wood within the foreſt; or it may denote the money paid for the ſame to the foreſters. Sometimes it alſo ſeems to ſignify an immunity from this payment by the king's grant.

WOOD-HAY, an antient cuſtom at Exeter, whereby a log out of every ſeam of wood over Ex-bridge is taken, towards the reparation of that bridge.

WOOD-LOUSE, in zoology, a name given to ſeveral ſpecies of oniſcus. See the article ONISCUS.

The common wood-louſe, or millepes, is the oniſcus with a blunt forked tail. See the article MILLEPES.

The black wood-louſe is the oniſcus with an obtuſe undivided tail, growing to an inch in length, and being of an oval figure; and the ſea-wood-louſe is the oniſcus, with a ſubulated tail, appendiculated on each ſide.

WOOD-MOTE, the antient name of that foreſt court, now called the court of attachment. See the articles ATTACHMENT and FOREST.

WOOD-PLEA-COURT, a court held twice a year in the foreſt of Clun, in Shropſhire, for determining all matters relating to wood.

WOOD-PECKER, *picus*, in ornithology, a genus of birds with the beak ſtraight, of a polyhedral or many-ſided figure, and with its point formed in the manner of a wedge; the tongue is rounded and very long, it reſembles in form a worm, or ſome other ſuch inſect; the toes, in all but one ſpecies, ſtand two before and two behind, as in the parrot. This genus comprehends the great black wood-pecker, with a ſcarlet-head, in ſize ſomewhat larger than that of a fieldfare; the green wood-pecker, with a ſcarlet crown; the great ſpotted wood-pecker, with a black head, and ſome of the tail-feathers white; the leſſer ſpotted wood-pecker, with three lateral rectrices, variegated with white at top; the middle ſpotted wood-pecker, with three lateral rectrices, half black; the three-toed wood-pecker, with only three toes; the braſilian wood-pecker, or ipecu, with a ſcarlet creſted head; and the golden wood-pecker, or the yellow picus. There are various other ſpecies of wood-peckers, as the brown picus, ſpotted with yellow; the black picus, with the wings and tail yellow, &c.

WOODSTOCK, a borough-town of Oxfordſhire, ſituated ſeven miles north of Oxford.

It ſends two members to parliament.

WOODWARD, an officer of the foreſt, whoſe function it is to look after the woods, and obſerve any offences either in vert or in veniſon, committed within his charge, and to preſent the ſame; and in caſe any deer are found killed, or hurt, to inform the verderer thereof, and to preſent them at the next court of the foreſt. See the article FOREST.

WOOF, among manufacturers, the threads which the weavers ſhoot acroſs with an inſtrument called the ſhuttle. See the articles SHUTTLE, WARP, WEB, WEAVING, CLOTH, &c.

The woof is of different matter, according to the piece to be wrought. In taffety, both woof and warp are ſilk. See the article TAFFETY.

In mohairs, the woof is uſually wool, and the warp ſilk. In ſattins, the warp is frequently flax, and the woof ſilk. See SERGE, SATTIN, VELVET, &c.

WOOL, the covering of ſheep. See the article SHEEP.

Each fleece conſiſts of wool of ſeveral qualities and degrees of fineneſs, which the dealers therein take care to ſeparate. The Engliſh and French uſually ſeparate each

each fleece into three principal ſorts, *viz.* 1. Mother-wool, which is that of the back and neck. 2. The wool of the tails and legs. 3. That of the breaſt and under the belly. The wool moſt eſteemed is the engliſh, chiefly that about Leominſter, Cotswold, and the Iſle of Wight; the Spaniſh, principally that about Segovia; and the French, about Berry.

The fineneſs and plenty of our wool is owing in a great meaſure to the ſhort ſweet graſs in many of our paſtures and downs; though the advantage of our ſheeps feeding on this graſs all the year, without being obliged to be ſhut up under cover during the winter, or to ſecure them from wolves at other times, contributes not a little to it.

Antiently, the principal commerce of the nation conſiſted in wool unmanufactured; which foreigners, eſpecially the French, Dutch, and Flemiſh, bought of us, inſomuch, that the cuſtoms paid on wool exported in the reign of Edward III. amounted, at 50s. a pack, to 250,000l. per annum. An immenſe ſum in thoſe days! But as wool is now accounted a ſtaple commodity, the employment of an infinite number of people at home, and our moſt beneficial trade abroad, depending upon it, very ſevere laws have been made to prevent its being exported, and perſons that export wool beyond the ſeas, are liable to a forfeiture of the ſhips or veſſels in which it is found, with treble the value, and the perſons aiding and aſſiſting in it ſhall ſuffer three years impriſonment. It is alſo enacted, that no ſheep ſhall be carried on board any ſhip with intent to be exported, upon forfeiture of 20 s. for every ſheep; that the owners knowing thereof, are to forfeit their intereſt therein; that if they be aliens, or natural born ſubjects not inhabiting this kingdom, ſuch ſhips ſhall be wholly forfeited; that the maſters and mariners knowing thereof, and aſſiſting therein, are to forfeit all their goods and chattels, and to ſuffer three months impriſonment; and that the exporter, beſides other penalties, ſhall be rendered incapable of ſuing for any debt, &c. As to the importation of wool, Iriſh wool, combed or uncombed, Spaniſh and Poliſh wool may be imported duty free.

Wool, is alſo uſed for the ſoft hair growing on ſeveral wild beaſts, the ſkins of which are diſtinguiſhed by the name of furrs. See the article Furr.

Theſe kinds of wool, on being imported, pay the following duties: bever-wool, cut and combed, 14 s. $\frac{3}{4}$ d. the pound: the whole of which is drawn back on exportation: but if this wool be combed in Ruſſia, and imported from thence in britiſh ſhips, it is free. Coney wool, the pound, $1\frac{43\frac{5}{8}}{100}$ d. draw back $1\frac{29\frac{3}{8}}{100}$ d. Eſtridge-wool, imported in britiſh built ſhips, free; but if imported in thoſe that are foreign built, it pays 6 s. $8\frac{43}{100}$ d. the 112 pounds: draw back, 6 s. $\frac{45}{100}$ d. Stanes-wool, the pound $\frac{71\frac{13}{16}}{100}$ d. draw back $\frac{64\frac{11}{16}}{100}$ d.

For the divers preparations of wool, ſee Carding, Combing, Spinning, Weaving, Fulling, Cloth, &c.

*Cotton-*Wool. See the article Cotton.

Wool-staple, denotes a city or town where wool uſed to be ſold. See the article Staple.

Wool-winders, are perſons employed in winding up fleeces of wool into bundles to be packed and ſold by weight. Thoſe are ſworn to do it truly between the owner and the merchant.

*Pocket of* Wool. See the article Pocket.

*Salplar of* Wool. See Salplar.

Woolen manufactory, includes the ſeveral ſorts of commodities into which wool is wrought, as broad cloth, long and ſhort kerſeys, bays, ſerges, flannel, perpetuanas, ſays, ſtuffs, frize, penniſtones, ſtockings, caps, rugs, &c. See the article Cloth, &c.

Woolsted. See the article Worsted.

WOOLWICH, a market-town of Kent, ſituated on the river Thames, ſix miles eaſt of London.

WORCESTER, the capital city of Worceſterſhire, ſituated on the river Severn, 110 miles north-weſt of London: weſt long. 2° 15′, north lat. 52° 5′.

WORCUM, a town of Holland, ſituated on the river Waal, twenty-three miles eaſt of Rotterdam. This is alſo the name of a port-town of the United Netherlands, ſituated on the province of Frieʒland, on the Zuyder-ſea, twenty miles ſouth-weſt of Lewarden.

WORD, in language, an articulate ſound deſigned to repreſent ſome idea. See Sound, Voice, Sign, Idea, &c.

The port-royaliſts define words to be diſtinct articulate ſounds, agreed on by mankind to convey their thoughts and ſen-

timents by. See the article LANGUAGE.

Word, in writing, is defined to be an aſſemblage of ſeveral letters forming one or more ſyllables, and expreſſing the name, quality, or manner of a thing. See the articles LETTER, SYLLABLE, QUALITY, *&c.*

Etymology and ſyntax being the two parts of grammar converſant about words, the firſt of theſe explains the nature and propriety of words, and the other treats of the right compoſition of words in diſcourſe. See the articles GRAMMAR, ETYMOLOGY, *&c.*

The moſt remarkable thing in the pronouncing of words, is the accent, or the elevation of the voice, on ſome particular ſyllable of the word, which elevation is neceſſarily followed by a depreſſion of the voice. See the article ACCENT.

Grammarians generally divide words into eight claſſes, called parts of ſpeech. See SPEECH, and PARTS *of Speech.*

Words are again divided into primitives and derivatives, ſimple and compound, ſynonymous and equivocal. See the article PRIMITIVE, *&c.*

With regard to their ſyllables, words are farther divided into monoſyllables and polyſyllables. See the articles MONOSYLLABLE and POLYSYLLABLE.

The grammatical figures of words which occaſion changes in the form, *&c.* thereof are proſtheſis, aphæreſis, ſyncope, epentheſis, apocope, paragoge, craſis, diæreſis, metatheſis, and antitheſis. See the article PROSTHESIS, *&c.*

The uſe of words, we have obſerved, is to ſerve as ſenſible ſigns of our ideas; and the ideas they ſtand for in the mind of the perſon that ſpeaks, are their proper ſignifications. See the articles SIGN, SEMEIOTICA, SCIENCE, *&c.*

Simple and primitive words have no natural connection with the things they ſignify, whence there is no rationale to be given of them; it is by mere arbitrary inſtitution and agreement of men, that they come to ſignify any thing. Certain words have no natural propriety or aptitude to expreſs certain thoughts more than others; were that the caſe there could have been but one language. But in derivative, and compound words the caſe is ſomewhat different. In the forming of theſe, we ſee regard is had to agreement, relation, and analogy; thus moſt words that have the ſame ending, have one common and general way of denoting or ſignifying things; and thoſe compounded with the ſame prepoſitions, have a ſimilar manner of expreſſing and ſignifying ſimilar ideas, in all the learned languages where they occur.

For the perfection of language, it is not enough, Mr. Locke obſerves, that ſounds can be made ſigns of ideas, unleſs theſe can be made uſe of ſo as to comprehend ſeveral particular things; for the multiplication of words would have perplexed their uſe, had every particular thing needed a diſtinct name to be ſignified by. To remedy this inconvenience, language had a further improvement in the uſe of general terms, whereby one word was made to mark a multitude of particular exiſtences; which advantageous uſe of ſounds was obtained by the difference of the ideas they were made ſigns of, thoſe names becoming general which are made to ſtand for general ideas, and thoſe remaining particular, where the ideas they are uſed for are particular. See the articles TERMS, GENERAL, ABSTRACT, *&c.*

It is obſervable, that the words which ſtand for actions and notions, quite removed from ſenſe, are borrowed from ſenſible ideas; as to imagine, apprehend, comprehend, underſtand, adhere, conceive, inſtil, diſguſt, diſturbance, tranquillity, *&c.* which are all taken from the operations of things ſenſible, and applied to modes of thinking. Spirit, in its original ſignification, is no more than breath; angel, a meſſenger. By which we may gueſs what kind of notions they were, and whence derived, which filled the minds of the firſt beginners of languages; and how nature, even in the naming of things unawares, ſuggeſted to men the originals of all their knowledge; whilſt to give names that might make known to others any operations they felt in themſelves, or any other ideas that came not under their ſenſes, they were forced to borrow words from the ordinary and known ideas of ſenſation. See SENSATION, PERCEPTION, *&c.*

The ends of language, in our diſcourſe with others, are chiefly three; firſt, to make our thoughts or ideas known one to another. This we fail in, 1. when we uſe names without clear and diſtinct ideas in our mind. 2. When we apply received names to ideas, to which the common uſe of that language doth not apply them. 3. When we apply them unſteadily, making them ſtand now for one, and anon for another idea. Secondly,

condly, to make known our thoughts with as much eafe and quicknefs as poffible. This men fail in, when they have complex ideas, without having diftinct names for them, which may happen either through the defect of a language which has none, or the fault of the man who has not yet learned them. Thirdly, to convey the knowledge of things. This cannot be done but when our ideas agree to the reality of things. He that has names without ideas, wants meaning in his words, and fpeaks only empty founds. He that has complex ideas without names for them, wants difpatch in his expreffion. He that ufes his words loofely, and unfteadily, will either not be minded or not underftood. He that applies names to ideas, different from the common ufe, wants propriety in his language, and fpeaks gibberifh; and he that has ideas of fubftances difagreeing with the real exiftence of things, fo far, wants the materials of true knowledge. See the articles IDEA and KNOWLEDGE.

WORD, or *Watch*-WORD, in an army or garrifon, is fome peculiar word or fentence, by which the foldiers know and diftinguifh one another in the night, &c. and by which fpies and defigning perfons are difcovered. It is ufed alfo to prevent furprizes. The word is given out in an army every night to the lieutenant, or major-general of the day, who gives it to the majors of the brigades, and they to the adjutants; who give it firft to the field-officers, and afterwards to a ferjeant of each company, who carry it to the fubalterns. In garrifons it is given after the gate is fhut to the town-major, who gives it to the adjutants, and they to the ferjeants. See ROUNDS.

WORD, in heraldry, &c. See MOTTO.

WORDS, in law, which may be taken in a common fenfe, fhould not receive a ftrained or unufual conftruction; and fuch as are ambiguous, are to be conftrued fo as to make them ftand with law and equity, neither may they be wrefted to do wrong: neverthelefs the different placing of the fame words may caufe them to have a different meaning; alfo where words are either fenfelefs or needlefs in a deed, they fhall do no hurt, if the fame is good and perfect without thofe words.

WORK, in the manege. To work a horfe, is to exercife him at pace, trot, or gallop, and ride him at the manege. To work a horfe upon volts, or head and haunches in or between two heels, is to paffage him, or make him go fide-ways upon two parallel lines.

WORK HOUSE. See *Work*-HOUSE.

WORKS, *opera*, in fortification, the feveral lines, trenches, ditches, &c. made round a place or army, or the like, to fortify and defend it. See the articles FORTIFICATION, LINE, TRENCH, &c.

For the feveral forts of works, as clock-work, fire-work, fret-work, horn-work, ruftic-work, wax-work, &c. fee the articles CLOCK-*work*, FIRE-*work*, &c.

WORKSOP, a market-town of Nottinghamfhire, fituated twenty miles north of Nottingham.

WORLD, *mundus*, the affemblage of parts which compofe the univerfe. See the article UNIVERSE.

The duration of the world is a thing which has been greatly difputed. Plato, after Ocellus Lucanus, held it to be eternal, and to have flowed from God as rays flow from the fun. Ariftotle was much of the fame mind; he afferts, that the world was not generated fo as to begin to be a world, which before was none: he lays down a pre-exifting and eternal matter as a principle, and thence argues the world eternal. His arguments amount to this, that it is impoffible an eternal agent, having an eternal paffive fubject, fhould continue long without action. His opinion was generally followed, as feeming to be the fitteft to end the difpute among fo many fects about the firft caufe. See the articles MATTER, CAUSE, and PERIPATETIC *Philofophy*.

Epicurus, however, though he makes matter eternal, yet fhews the world to be but a new thing formed out of a fortuitous concourfe of atoms. See the articles ATOMICAL and EPICUREAN.

Some of the modern philofophers refute the imaginary eternity of the world by this argument, that if it be *ab eterno*, there muft have been a generation of individuals in a continual fucceffion from all eternity, fince no caufe can be affigned why they fhould not be generated, *viz.* one from another. Therefore to confider the origin of things, and the feries of caufes, we muft go back in infinitum, *i. e.* there muft have been an infinite number of men and other individuals already generated, which fubverts the very notion of number. And if the caufe which now generates has been produced

by

by an infinite feries of caufes, how fhall an infinite feries be finite? Dr. Halley fuggefts a new method of finding the age of the world from the degree of the faltnefs of the ocean. See SEA.

*Syftem of the* WORLD. See SYSTEM.

WORMS, in the linnæan fyftem of nature, a clafs of infects of the order of the apteria, and of the clafs of the anarthra. See APTERIA and ANARTHRA.

The diftinguifhing character of this clafs is, that they have the mufcles of their body affixed to a folid bafis. The feveral fpecies of worms are very numerous; as the chætia, or the hair worm, called alfo the guinea-worm; the afcaris, the lumbricus, or earth-worm; and fea-worm; the tænia or tape-worm; the ficyania or gourd-worm; the iulus or gally-worm, &c. See CHÆTIA, &c.

WORMS, in hufbandry, are very prejudicial to corn-fields, eating up the roots of the young corn, and deftroying great quantities of the crop. Sea-falt is the beft of all things for deftroying them. Sea-water is proper to fprinkle on the land, where it can be had; where the falt fprings are, their water will do; and where neither are at hand, a little common or bay-falt does as well. Soot will deftroy them in fome lands, but is not to be depended upon, for it does not always fucceed. Some farmers ftrew on their lands a mixture of chalk and lime; and others truft wholly to their winter-fallowing to do it, if this is done in a wet feafon, when they come up to the furface of the ground, and fome nails with fharp heads be driven into the bottom of the plough. If they are troublefome in gardens, the refufe brine of falted meat will ferve the purpofe, or fome walnut leaves fteeped in a ciftern of water for a fortnight or three weeks, will give it fuch a bitternefs that it will be a certain poifon to them. A decoction of wood-afhes, fprinkled on the ground, will anfwer the fame purpofe; and any particular plant may be fecured both from worms and fnails by ftrewing a mixture of lime and afhes about its roots. It is a general caution among the farmers to fow their corn as fhallow as they can, where the field is very fubject to worms.

*Generation of* WORMS. See the article GENERATION.

WORMS, in medicine, a difeafe arifing from fome of thefe reptiles being engendered in the body, particularly in the ftomach and inteftines.

When children begin to ufe crude aliments, fummer fruits, flefh, cheefe, and other things of the like kind, they are frequently troubled with the worms, occafioned by the eggs of infects, which either float in the air, or live on the earth, and which being cafually fwallowed, are not digeftible by their tender ftomachs. For thefe, the inteftinal or gaftric pituit, afford a neft in which they refide, are nourifhed, bred, and increafe in bulk. Hence they are not fo common in adults, except in the dull and fluggifh, and in the leuco-phlegmatic.

There are three fpecies of worms, moft frequent in the human body; the lumbrici, the afcarides, and the tænia. The lumbrici are found in the ilion, and are thus called, becaufe they are generally broad and long, and roll themfelves up in a ftrange manner. The afcarides have their feat chiefly in the grofs inteftines, and are more plentiful in the rectum; they are round and fmall, and are thrown out in large quantities. The broad worm called tænia, is like a fwathe, commonly two ells long, but fometimes much longer, and divided through the whole length with crofs joints or knots. This is faid to be always fingle; and lies varioufly convoluted, being fometimes as long as all the guts, and fometimes even vaftly exceeding that length. Heifter obferves, that there are other kinds of infects, or worms, generated in an human body, which phyficians have not placed in any particular clafs, but have looked upon them as uncommon productions.

Worms, by their irritation, create naufeas, vomitings, loofeneffes, faintings; a flender, deficient, intermitting pulfe; itching of the nofe, and epileptic fits. By the confumption of the chyle, they produce hunger, palenefs, weaknefs, and coftivenefs; whence arifes a tumour of the abdomen, eructations, and rumbling of the inteftines.

A child may be known to have the worms from his age, cold temperament, palenefs of the countenance, livid eyelids, hollow eyes, itching of the nofe, voracity, ftartings, and grinding the teeth in fleep; and more efpecially by a fingular ftinking breath; but when they are voided by the mouth, or anus, there remains no manner of doubt.

The cure is to be performed chiefly by deftroy-

destroying their nests, which is to be attempted by alkalious salts; gums which purge phlegm, mercurials, antimonials, and bitter aromatics.

*Earth* WORM, *lumbricus*, a genus of insects of the class of the anarthra, of a rounded shape, and covered with a soft and tender skin, marked with annular ridges and furrows. This insect, when full grown, is often ten inches in length, and more than a third of an inch in diameter; its colour is a dusky red, and its skin is formed into rings, but is smooth and soft to the touch.

*Sea* WORM, is the rough lumbricus, growing to a foot, or more in length, and to the thickness of a man's finger.

*Guinea* WORMS, *dracunculi*. See the article DRACUNCULI.

WORM, in gunnery, a screw of iron, to be fixed on the end of a rammer, to pull out the wad of a firelock, carabine, or pistol, being the same with the wadhook, only the one is more proper for small arms, and the other for cannon.

WORM, in chemistry, is a long, winding, pewter pipe, placed in a tub of water, to cool and condense the vapours in the distillation of spirits.

WORM, a *cable*, or *hawser*, in the sea-language, is to strengthen it by winding a small line, or rope, all along between the strands.

WORMS, in geography, an imperial city of Germany, in the palatinate of the Rhine: east long. 8° 5′, north lat. 49° 38′.

WORM-SEED, *semen santonicum*, is the seed of a species of worm-wood, which grows in the Levant, from whence we have the seed, which is there produced in great plenty, without the trouble of sowing; this plant growing wild in the fields. See WORMWOOD.

The seed of this plant is light and chaffy, enveloped with a vast many thin membranes, that have the same virtue with the seed itself, and are used with it under its name. It is a small and light seed, of a pale yellowish brown colour, with some admixture of greenish in it, of an oblong form, somewhat larger at the base, and tapering to a point at the summit. It is of a friable texture, easily beat to powder. It has not much smell, but is of a bitter taste. Worm-seed is to be chosen large, fresh and clean, not dusty or decayed, or hanging together in clusters, which is a sign of insects being, or having been among it.

Its great virtue is that of destroying worms in children: but as it is too bitter to be easily swallowed by them either in powder or decoction; it is therefore best taken by way of comfit covered over with sugar.

Worm-seed, on being imported, pays a duty of $7\frac{1}{4}$d. the pound, and draws back, $6\frac{80}{100}$d.

WORMWOOD, *absinthium*, in botany. See the article ABSINTHIUM.

Wormwood, besides the virtues attributed to it under its generical name, is prepared into an oil, and fixed salt, the former of which is used externally to the belly, to destroy worms in the intestines, and the latter is a famous febrifuge and stomachic.

WORONETS, or VERONESE, a city of Russia, in the province of Belgorod, situated on the river Veronese, near its confluence with the Don: east long. 40°, north lat. 52°.

WORSHIP *of God*, the offering up of adoration, prayer, praise, thanksgiving and confession to God, as our creator, benefactor, law-giver and judge.

Internal piety, or the worship of the mind, is that which flows from the heart in devout aspirations addressed to the deity without the use of verbal expressions uttered in an audible manner. External worship is founded on the same principles as the internal, and is either private or public. A worship that is purely intellectual, is too spiritual and abstracted for the bulk of mankind. The operations of their minds, especially such as are employed on the most sublime objects, must be assisted by their outward organs, otherwise they will be soon dissipated by sensible impressions, or grow tiresome if too long continued: for ideas are such fleeting things, that they must be fixed; and so subtile, that they must be expressed and delineated, as it were, by sensible marks and images, otherwise we cannot long attend to them. Hence arises the necessity of external worship, which by stated acts of devotion, fixes our attention, composes and enlivens our thoughts, impresses us more deeply with a sense of the awful presence in which we are, and tends to heighten our devout affections. This holds true in the case of public worship; for as God is the parent and head of the social system, and has formed us for a social state; as there are public blessings, and crimes in which we have all, in some degree, a share; and public wants and dangers, to which all are

are expoſed; it is therefore evident, that ſolemn offices of public worſhip are duties of indiſpenſible moral obligation, among the beſt cements of ſociety, the firmeſt prop of government, and the faireſt ornament of both.

WORSTED, a kind of woollen thread, which, in the ſpinning, is twiſted harder than ordinary. It is chiefly uſed either wove or knit into ſtockings, caps, gloves, or the like.

WORSTED, a market-town of Norfolk, ſituated ſeven miles north of Norwich.

WOTTON, a market-town of Glouceſterſhire, ſituated ſeventeen miles ſouth of Glouceſter.

WOTTEN BASSET, a borough-town of Wiltſhire, twenty-five miles north of Saliſbury; which ſends two members to parliament.

WOULDING, a ſea-term for the winding of ropes, round a maſt or yard of a ſhip, that has been ſtrengthened by a piece of timber nailed to it.

WOUND, *vulnus*, in medicine and ſurgery, is frequently defined to be a violent ſolution of the continuity of the ſoft external parts of the body made by ſome inſtrument. Others take a greater latitude in defining it, and call every external hurt of the body, by what cauſe ſoever produced, a wound. On the other hand, ſome are of opinion, that unleſs the injured parts of the body are divided by ſome ſharp inſtrument, as by a ſword or knife, it is by no means to be called a wound; but notwithſtanding, it is certain that thoſe wounds which are produced by blunt inſtruments may properly enough be called wounds, whence Heiſter diſtinguiſhes two different kinds of wounds, the one made by acute, the other by blunt inſtruments.

Wounds are generally inflicted upon the ſofter parts of the human body, ſuch as the ſkin, fat, muſcular fleſh, ligaments, blood-veſſels, and nerves, and parts that are compoſed of theſe, as the viſcera and inteſtines; yet the more ſolid parts of the body are by no means to be here excluded, as the bones, whence the parts that are ſubject to thoſe injuries will afford two diſtinctions of wounds; one, wounds of the ſoft parts, the other, wounds of the bones.

As cauſes of wounds, all inſtruments of what kind ſoever, whether blunt or ſharp, may properly be reckoned, provided they are of ſuch a nature, that upon the violent external application of them, they are capable of producing a ſolution of continuity in the parts of the body upon which they are inflicted; for a ſolution of the external parts from an internal cauſe, is not called a wound, but rather an abſceſs, or ulcer; ſo when the harder parts of the body, to wit, the bones, are broken by a fall, or a violent blow received from a blunt inſtrument, it is termed a fracture. See the articles ABSCESS, ULCER, FRACTURE, and CONTUSION.

The effects which are produced by wounds, beſides the diviſion of the ſofter parts, are generally profuſions of blood, though they are ſometimes attended with much greater miſchiefs than theſe, for it can ſcarcely happen, but that the divided parts muſt, in ſome meaſure, if not totally, loſe their natural functions, according to the different uſes for which the part is intended, and according to the different degrees of injury that it receives. The greater number of uſes a part is intended for by nature, the worſe will be the conſequences of a wound upon that part; this principle is ſo extenſive, that it is the conſtant guide in forming a prognoſtic, whether the wound will prove mortal or not. He therefore, who is beſt ſkilled in anatomy, that is, beſt inſtructed in the ſituation of the parts, and their uſes, will be enabled to form the moſt accurate judgment of the conſequence that will neceſſarily attend a wound upon any particular part.

What has been ſaid of the different ſituations and cauſes of wounds, ſufficiently demonſtrates, that there are many different kinds of wounds, ſome brought on by a puncture, ſome by a ſtab, and ſome again by a blow; ſome are curable, others incurable; ſome are made with ſharp inſtruments, others with blunt ones; with regard to their figure, ſome form a right line, others are curved, tranſverſe, or oblique; with reſpect to their ſituation, ſome are placed in the head, others in the neck, thorax, or abdomen; and of theſe ſome are internal, others external; variety of different wounds ariſe from the great diverſity of condition that wounds are left in, for in ſome wounds, the inflicting inſtrument, or part of it, remains; for inſtance, a leaden bullet, a piece of glaſs, or of a granade; the points of ſwords or arrows: but in ſome wounds, nothing of this kind is left: ſometimes fractures of the bones accompany wounds, which is generally the caſe in gun-ſhot wounds;

wounds: some wounds are also attended with poison, as those which are made with poisoned arrows; under this head may be ranked the bites of animals, but more particularly of mad or venomous animals. Some are of opinion, that wounds which are made with copper, or silver instruments, should be reckoned in this class, the poison of which, if there is any, is owing to the vitriol that is mixed with these metals. See the articles PUNCTURE, STAB, BLOW, NECK, THORAX, ABDOMEN, GUN-SHOT-*wounds*, POISON, *&c.*

In slight wounds, where no considerable artery, nerve, or tendon is concerned, the following appearances are usually remarkable; at first sight the wound appears as a red line drawn upon the part: but upon being dilated, the blood instantly gushes out in greater or smaller quantities, according to the size and number of the blood-vessels that are injured. The hæmorrhage, after a short continuance, stops of its own accord, and the blood concreting in the wound, forms a crust; the lips of the wound now begin to look red, and swell, and are attended with some degree of pain and inflammation; if it is a large wound, a fever, that is to say, an universal heat and quickness of pulse, almost always ensue upon the third or fourth day; sooner or later, a whitish glutinous humour, not unlike white oil, appears, and this is known by the name of pus, or matter; upon the appearance of matter, the redness, tumour, pain, inflammation, and fever, disappear entirely, or at least are abated; and these are the signs of a wound inclining to heal; for under the matter new flesh springs up from the wounded vessels, which having by degrees filled the wound, dries upon its upper part, and forms a cicatrix. See the articles VEIN, ARTERY, NERVE, TENDON, HÆMORRHAGE, PUS, TUMOUR, INFLAMMATION, and CICATRIX.

In dangerous wounds, that is, where any considerable blood-vessel is wounded or divided, there generally ensues so violent a hæmorrhage, that the wounded person is in an instant sensible of great loss of spirits, and weakness, and faints away: and when the larger arteries are wounded, whether they are internal or external, he dies upon the spot; although somewhat less danger is apprehended from wounds that are inflicted upon the vessels which are situated upon the external parts of the body (some few excepted) because they will admit of the ligature, and other means of restraining the violence of the hæmorrhage.

There is nothing will give a truer light into the nature and consequence of a deep wound, than a due consideration of what natural actions of the body are impeded thereby. For instance, in wounds of the breast, when the patient draws his breath with shortness and difficulty, and is at the same time attended with an hæmoptysis and hiccoughs, it may be rationally conjectured that the lungs or the diaphragm are wounded; so in wounds of the abdomen, when chyle is voided, it is a plain indication that the stomach, small guts, or lacteals, are wounded: when excrements pass by the wound, the great guts are wounded. In the same manner, bilious blood shews the liver or gall bladder to be divided: if urine passes by the wound, the urinary bladder, or else the ureters, are wounded; and bloody urine denotes a blow on the kidneys, or a wound of the bladder; but when there are large profusions of blood this way, it is a sign that some of the larger blood-vessels are wounded: vomiting of blood, declares the stomach to be the injured organ: violent pains, attended with convulsive twitches, shew that a nerve is wounded, or else that some foreign substance is left in the wound. Whenever the senses are disordered after a wound received on the head, a concussion of the brain is much to be feared. Difficulty of breathing, pains in the breast, and hiccoughing, are symptoms of a wound in the diaphragm. It is of bad consequence for a wound to be attended with a large tumour; but it is of the last consequence if it is attended with no degree of tumour at all; the first is an indication of great inflammation, the last of mortification; some degree of tumour is always therefore best in wounds.

In order to inquire what wounds admit of a cure, and what are incurable, Heister divides wounds into three sorts. 1. Some wounds are absolutely of themselves mortal. 2. Others are in their own nature mortal, if not relieved by timely assistance. And, 3. Others become mortal by accident or imprudent treatment, though they were otherwise cureable.

1. We properly style those wounds mortal which are not to be remedied

died by all the art and induftry of man. Thus, wounds are of this kind which are attended with fo violent an hæmorrhage, as to produce inftant death: of this fort are reckoned wounds that penetrate the cavities of the heart, and all thofe wounds of the vifcera, where the large blood-veffels are opened; fuch are large wounds of the lungs, liver, fpleen, kidneys, ftomach, inteftines, mefentery, pancreas, uterus; of the aorta, of the iliac, cœliac, renal, mefenteric, and carotid arteries; efpecially if they are wounded near their origin; of the fubclavian alfo, or vertebral; of the vena cava, the iliac vein, the internal jugular, vertebral, renal, mefenteric; of the vena porta, and of the larger veins that lie deep in the body, becaufe their fituation will not admit of proper applications to reftrain the flux of blood. Heifter therefore reckons, very juftly, thefe among the wounds that are abfolutely incurable, fince they are not remediable either by aftringents, ligature, or fire.

Thofe wounds alfo are not lefs mortal than the former, which obftruct, or entirely cut off the paffage of the animal fpirits to the heart; fuch are wounds of the cerebellum, of the medulla oblongata, and fome violent ftrokes of the brain itfelf. There is reafon to apprehend very great danger, when the fmall veins or arteries, which are contained in the cranium, are injured; for the blood flowing from them into the internal finufes of the brain, either produces too great a preffure upon thofe very tender parts of the brain, and fo obftructs the courfe of the blood and fpirits; or elfe, being corrupted, it putrifies the brain itfelf, if it cannot be evacuated by the affiftance of the trepan; which is the cafe when this accident happens at the lower part of the cranium, or in the finufes of the brain; nor is there lefs danger where the nerves, which tend to the heart, are wounded, or entirely divided; for, after this, it is impoffible for the heart to continue its motion. See the articles TREPAN, HEART, &c.

To this clafs are to be referred alfo all wounds which entirely deprive the animal of the faculty of breathing: there is therefore great danger where the afpera arteria is intirely divided; for where it is only divided in part, it may be healed again by the affiftance of an expert furgeon: to this place alfo belong violent fhocks of the bronchia, mediaftinum, and diaphragm, efpecially the tendinous part of it. See ASPERA ARTERIA, &c.

Thofe wounds alfo which interrupt the courfe of the chyle to the heart, are no lefs incurable than the former; fuch are wounds of the ftomach, inteftines, receptacle of the chyle, thoracic duct, and larger lacteals; to which may be alfo added wounds of the œfophagus, if they are large; though death is not fo fudden an attendant on thefe wounds; but, for want of nourifhment, the perfons afflicted by them are weakened by degrees, and at length die confumptive. See the articles STOMACH, INTESTINE, &c.

In this account thofe wounds alfo are not to be omitted, which are inflicted upon membranous parts, that are fituated in the abdomen, and contain fome fecreted fluid, as on the bladder, either of the bile or urine, the ftomach, inteftines, receptacle of the chyle, and lacteal veffels. The fluids contained in thefe parts, when once they are let loofe into the cavity of the abdomen, cannot be properly difcharged, and therefore eafily corrode the internal parts of the body; and the membranes that contained them are generally fo fine, that they will not admit of agglutination, efpecially fince no medicine from without can be applied. A few indeed have recovered after flight wounds in thefe parts; but fince the number of thefe inftances is but few, and the cure in them has been accidental, and not performed by the furgeon's art, thefe may very juftly be added to the lift of mortal wounds. See ABDOMEN, &c.

2. Many wounds there are which though the experienced furgeon could remedy, yet prove fatal, if neglected, or left to nature: of this number are thofe which produce inftant death, unlefs relieved by prefent affiftance; fuch are wounds of the larger external blood-veffels, which might be remedied by ligature, by the application of aftringent medicines, or the actual cautery. Of this kind are wounds of the brachial, or crural artery, unlefs they are too near the trunk of the body; wounds in the large arteries of the cubit, or tibia; of the branches of the external carotid, or temporal artery; to thefe alfo may be added wounds of the jugular and other veins, fituated upon the external parts of the body; but in thefe cafes no help can be given, unlefs the furgeon be brought before there has been a vaft profufion of blood. See the article CRURAL ARTERY, &c.

3. Wounds are properly said to become mortal by accident, where the patient's death, from them, is occasioned either by the ill conduct of the patient himself, or by the neglect or ignorance of his surgeon; the wound itself being of the number of those deemed curable by the judicious practiser. Under this head are to be reckoned, 1. Those wounds which the surgeon has neglected to cleanse sufficiently, though he had it in his power to do it; as when some foreign body, which might easily have been extracted, is left in the wound, and produces inflammations, hæmorrhages, convulsions, and finally death itself; so in wounds of the thorax and abdomen, if the surgeon does not use his utmost diligence to evacuate the grumous blood, it will corrupt there, and by drawing the neighbouring parts into consent, will expose the patient to death: great care must also be taken that the lips of the wound do not close till the blood that is collected in the cavity of the body be all evacuated if possible, which will be easily perceived by the difficulty of breathing, and other bad symptoms going off; but if any of the larger internal vessels are wounded, then all attempts to discharge the blood are vain, for the violence of the hæmorrhage takes off the patient. 2. Wounds are also to be accounted mortal by accident, which are treated or searched in too rough a manner by the surgeon; for if wounds are handled roughly, which are full of nervous parts, or of large blood-vessels, there is great danger of bringing on hæmorrhages, convulsions, inflammations, gangrenes, and finally death itself. The case is also the same, 3. in external wounds, which are slight of themselves, but under which the patient is lost by the inflammation, which is increased and brought on by the surgeon's injudicious treatment; or, 4. when any one is taken off by the violence of the hæmorrhage from a wound of the hand or foot; for in this case, the surgeon might easily have stopped the blood by the application of proper remedies, or by ligature; or, 5. when the patient is guilty of any intemperance in eating or drinking, or of any excess of passion, of exposing himself to the cold air, or of using violent exercise. For by these means, wounds, more especially those of the head, by being liable to fresh hæmorrhages, and other dangerous accidents, frequently become mortal, notwithstanding they naturally would not prove so, and though the surgeon uses his utmost care and skill. 6. Among these also are to be accounted those wounds of the head, where the patient is lost by the vast quantity of blood, which is extravasated in the cavity of the cranium, and confined there; but where he might have been relieved if the trepan had been applied in time; for though wounds of this kind generally prove incurable, yet, as there is at least a possibility of saving a person in these circumstances, by the use of the trepan, this may properly be reckoned among the doubtful cases, and not deemed absolutely mortal. 7. And lastly, a bad habit of body prevents the cure of wounds, which would admit of an easy cure in healthy subjects; so we often see the slightest puncture on the hand or foot of an hydropical, consumptive, or scorbutic person, shall produce a gangrene, and prove mortal; though the surgeon spares no care nor application to prevent it. See the articles Gangrene, Extravasation, Dropsy, Scurvy, *&c.*

*Cure of* Wounds. Since a wound is a solution of the continuity of the parts of the body, the reunion of those parts seems to be the principal intention; but since wounds are of very different kinds, some slight, and others of great consequence, in proportion to this difference, so will the manner of prosecuting this intention differ.

The cure of slight wounds is generally performed with great ease, by applying a small portion of lint to the part, well saturated with spirit of wine, oil of eggs, turpentine, basilicon, the balsam of Arcæus, of Peru, *&c.* securing the dressings with a plaster, and renewing them once in a day or two: by this means, the lips of the wound will presently agglutinate.

Wounds which are attended with some danger, are to be treated as follows: in the first place, the wound is to be cleansed from all extravasated blood, sordes, *&c.* in the next place, if a bullet, the point of a sword, any part of the clothing, a piece of glass, or any other foreign body, shall remain in the wound, it is to be removed with the fingers, or with proper instruments, as has been already explained under the articles Extraction, and Gun-shot wounds. The hæmorrhage is to be stopped at the first dressing; the divided parts are to be brought as near each other as possible,

and their situation is to be so maintained, that the cicatrix which is left may appear even. See the articles HÆMORRHAGE, BANDAGE, and CICATRIX.

Among the number of the most simple wounds are reckoned those which are made by puncture, or stabbing upon the external parts, and not penetrating deep, the method of treating which has been given under the article PUNCTURE.

The method of treating a cut, or such a wound as is made by a cutting instrument, where no part of the flesh is taken off, and the accident happens to the external parts of the body, and does not penetrate deep, after the wound is cleansed, it should be dressed with the same vulnerary balsam, and the lips of the wound should be closed, and kept in that situation. This is done after different methods, according to the difference of the wound. 1. It is to be done by placing the wounded part in a proper posture, that is, as soon as the wound is dressed, the part should be placed in such a situation, that the divided parts may be most likely to keep in constant contact. 2. By a proper bandage, tying up the parts so that the lips may meet, and thereby easily unite. 3. By a proper suture, which differs according to the difference of the wound, but may be generally divided into the dry and bloody suture; the dry, or as some call it, the bastard suture, is the application of sticking plasters, to keep the lips of the wound united; the bloody, or true suture, is performing the same thing with a needle and thread; the nature and method of each of which has been already treated of under the article SUTURE.

If the wound heals by the assistance of the suture, the threads or ligatures are to be cut near the knots; the lower lip of the wound is to be suspended with one hand, while the threads are gently drawn out by the other; the punctures that are left will easily heal by the application of a vulnerary water, called by the french *l'eau d'arquebusade*, or by injecting aqua calcis, or spirit of wine, and laying on compresses, dipped in the same liquors; but larger wounds are to be dressed with the balsam of arcæus, or balsam of capivi, *&c.* and the lips kept firm together, with some sticking plaster, till a firm cicatrix is formed.

Where there is a loss of substance, the wound will not unite either by the help of plaster, or suture, till it is filled up with new flesh. For this purpose, you will find lint dipped in oil, or spread with some vulnerary balsam, or ointment, and applied to the bottom of the wound, very serviceable, covering it with a plaster, compress and proper bandages, and this dressing is to be repeated daily. As hot or cold air is very hurtful to wounds, so it must by all means be kept from them, for which reason the surgeon should be careful not to remove the old dressings till the fresh ones are got ready, and to be as expeditious as possible in applying them. After this, when a white, even, thick matter appears in the wound, it should be dressed as you see occasion, every day, or every other day; the superfluous matter should be wiped away with a very light hand; and it is better to leave some behind, than to treat the wound roughly. These rules being observed, the flesh will spring up presently, and the wound unite; and in order to perfect the cure of the wound, an even cicatrix should, if possible, be procured, for the method of obtaining which, see the article PUS, *&c.*

When any uncleanness or foulness is perceived in a wound, that is, if the flesh is putrid, fungous, black or livid, it must be well cleansed before any attempt is made to heal it, for which purpose apply a digestive ointment, made with turpentine, yolk of eggs, and honey of roses; and where this is not strong enough, substitute the egyptian ointment, or spirit of wine diluted; or if you require more strength, use red precipitate mercury. Applications of this kind are to be continued till the wound is intirely clean; after which, recourse is to be had to the methods already prescribed. If the new flesh should be luxuriant, and rise up so as to prevent the formation of an even cicatrix, it must be taken down with green vitriol, or a powder composed of burnt alum, and red precipitate mercury; at the same time making a proper pressure, with the plasters, compresses, and bandages, till the parts are even. See the article FUNGUS.

The patient should observe a strict regimen with regard to his diet and manner of life, as nothing forwards the cure so much as a good habit of body, which may be procured by observing a strict regularity with regard to diet, air, keeping the passions under, and indulging neither too much sleep, nor suffering too great watchfulness; and it is to be ob-

ferved, that the greater tendency there is in a patient to a difeafed ftate of body, fo much the ftricter courfe of life ought he to obferve. See the articles DIET, REGIMEN, AIR, SLEEP, WATCHFULNESS, PASSIONS and DISEASE.

The bowels fhould by all means be kept open, efpecially in thofe who have received a wound in the head; however, it is to be obferved, that ftrong cathartic medicines are to be avoided; but it is not only fafe but advifeable to eat and drink thofe things that may at the fame time nourifh and keep the body open. To this end the patient may drink plentifully of tea or coffee, may eat ftewed prunes, roafted apples: but hard meats of all kinds are forbid: where the patient is fo bound up, that a diet of this kind has no effect, it will be neceffary to have recourfe to medicines, but then thofe muft be of the mildeft kind; here a gentle clyfter may be given, a fuppofitory may be ufed, or an ounce or two of manna, or fome purging falts in warm broth may be prefcribed: whenever the violence of the wound, or the ill habit of the patient require the ufe of internal remedies, vulnerary drinks will be found to be of the greateft confequence, in compofing which, the conftitution of the patient, and the nature of the complaint fhould be diligently confulted; for if the patient is of a phlegmatic habit of body, cold, pale, or naturally fubject to tumours, then the vulnerary decoction fhould be compofed of herbs that attenuate and divide the blood. See ATTENUANTS.

If the patient has a thin fharp blood, then decoctions of vifcous and glutinous plants will be proper; but if he is vexed with great pain or wakefulnefs, then fome opiates muft be adminiftred. If he fhould be troubled with an acidity, abforbents are proper; and when a quicknefs of pulfe, and an extraordinary heat are perceived, they are fure figns of a fymptomatical fever. See the articles AGGLUTINANTS, OPIATES, ABSORBENTS, and FEVER.

For the diforders accompanying wounds, commonly called the fymptoms of wounds, as hæmorrhages, pains, fpafms, convulfions, &c. See HÆMORRHAGE, &c.

For wounds in the neck, and wounds in the eyes, fee NECK and EYE.

For wounds in the abdomen, inteftines, &c. fee the articles ABDOMEN, GASTRORAPHY, INTESTINES.

For wounds of the thorax, fee the article THORAX.

For wounds of the head, fee the articles SKULL, FISSURE, CONTRA-FISSURE, EXTRAVASATION, CONTUSION, FRACTURE, TREPAN, &c.

For gun-fhot wounds, &c. fee the article GUN-SHOT *wounds*, &c.

For the treatment of fuch wounds as the patient undergoes in the feverer operations of furgery, fuch as lithotomy, trepanning, amputation of a limb, or large tumour, extirpation of the breaft, the cæfarean fection, &c. See the articles LITHOTOMY, TREPANNING, &c.

WOUNDS *in horfes*. The moft terrible wounds thefe creatures are fubject to, are thofe got in the field of battle. The farriers that attend camps, have a coarfe way of curing thefe; but it is a very expeditious and effectual one. If the bullet be within reach, they take it out with a pair of forceps; but if it lie too deep to be come at, they leave it behind, and drefs up the wound in the fame manner as if it were not there. They firft drop in fome varnifh from the end of a feather, and when the bottom is thus wetted with it, they dip a pledget of tow in the fame varnifh, which they put into the wound, and then cover the whole with the following charge: take a quarter of a pound of powder of bole armenic, half a pound of linfeed-oil, and three eggs, fhells and all; add to thefe four ounces of bean-flour, a quart of vinegar, and five ounces of turpentine; this is all to be mixed over the fire, and the wound covered with it. This application is to be continued four or five days; then the tent put into the wound is to be dipped in a mixture of turpentine and hogs-lard; by this means a laudable matter will be difcharged, inftead of the thin fharp water that was at firft. Then the cure is to be compleated by dreffing it with an ointment made of turpentine, firft well wafhed, and then diffolved in yolks of eggs, and a little faffron added to it.

This is the practice in deep wounds that do not go through the part; but in cafes where the bullet has gone quite through, they take a few weaver's linen-thrumbs, made very knotty; thefe they make up into a kind of link, and dipping it in varnifh, they draw it through the wound, leaving the ends hanging out at each fide; by means of thefe they move the link or fkain three or four times a day, always

always wetting the new part that is to be drawn into the wound with fresh varnish. They put on a charge of the bole armenic, &c. as before described, on each side of the wounded part, and continue this as long as the wound discharges thin watery matter, or the sides continue swelled. After this they dress it with the ointment of turpentine, yolks of eggs, and saffron, till it is perfectly cured.

The other methods are the dressing the wound with an ointment made of wax, turpentine, and lard, and covering it with linen-rags wetted with cream; or the dressing, with a mixture of yolks of eggs, honey, and saffron, and covering it up with cream and baum-leaves beaten together.

When the wound is so dangerous as to require the assistance of internal medicines, they give the following pills: take assa fœtida, bay-berries, and native cinnabar, of each a pound; beat up the whole into a mass with brandy, and roll it into pills of fourteen drams weight each. These are to be laid in a shady place to dry, after which they will keep ever so long without any damage. The horse is to take two of these every other day, or, if necessary, every day, till he has taken eight or ten of them; and he is to stand bridled two hours before and after the taking of them.

When the wound seems at a stand, not appearing foul, and yet not gathering new flesh, there must be recourse had to the following powder, whose effect in bringing new flesh is wonderful: take dragon's blood and bole-armenic, of each two ounces; mastic, olibanum, and sarcocolla, of each three drams; aloes, round birth-wort, and common iris root, of each one dram and a half; make the whole into a fine powder. This is sometimes used dry, sprinkling it on the wound; but sometimes it is mixed with turpentine, sometimes with juice of wormwood, and sometimes with honey of roses, and either way does very well. When the wound grows foul, and requires a detergent to cleanse it, the common liquor for this purpose is a phagedenic water, which they make of lime-water and sublimate, in this manner: take two pounds and a half of newly made and unslacked lime, put it into a pewter-vessel, and pour on it five quarts of boiling water: when the bubbling is over, let it stand to rest two or three days, stirring it often with a stick, then pour it clear off, after a due time, for the lime to settle; and filtre it through some whited-brown paper, made for the lining of funnels on this occasion. To a quart of the clear lime-water thus prepared, add eight ounces of spirit of wine, and one ounce of spirit of vitriol; when these are well mixed by shaking them together, then add an ounce of corrosive sublimate in fine powder: mix all well together, and keep the whole in a bottle to be used for the cleansing of these foul wounds, and on any other occasion where there may be a detergent of this powerful kind necessary. It will keep good many years. If this water will not thoroughly cleanse the wound, but there still will remain a quantity of foul matter in it, and there is danger of a gangrene, they add to it as much arsenic, in fine powder, as there was of the corrosive sublimate; that is, at the rate of an ounce to a quart and half a pint.

WRACK, or WRECK. See WRECK.

WRASSE, or OLD WIFE, in ichthyology, a species of labrus, with the rostrum turning upward, and the tail circular at the end. See the article LABRUS.

This is a very beautiful fish; its usual size is about ten inches in length, and considerably thick in proportion; the back-fin has twenty-six rays, fifteen of which are prickly; the pectoral fins have fourteen rays each; the ventral ones only six; the pinna ani has thirteen, and three of these are prickly; the tail is large, and is semicircular at the extremity.

WREATH, in heraldry, a roll of fine linen or silk (like that of a turkish turbant) consisting of the colours borne in the escutcheon, placed in an atchievement between the helmet and the crest, and immediately supporting the crest. See the article CREST, &c.

WRECK, called also *ship*-WRECK, or *ship*-WRACK, in law, is when a ship perishes on the sea, and no person escapes alive out of it.

In this case, if the ship so perished, or any part thereof, or the goods of the ship come to the land of any lord, and are left there, the lord shall have the same, as being a wreck of the sea: but if any single person, or even a dog, or other living creature, escape alive out of the ship, the party to whom the goods belong, may come within a year and a day, and proving the goods to be his, he shall have them again. And it is held that they are no wrecks, so long as they re-

remain at fea, within the jurifdiction of the admiralty. The year and day that fhall fubject the goods to be forfeited, muft be computed from the time of feizure; in which time, if the owner of the goods die, his executors or adminiftrators may make proof; but when the goods are bona peritura, the fheriff may fell them within the year, provided he difpofes of the fame to the beft advantage, and accounts for them. In cafe any goods fhipwrecked are feized by any perfon having no authority to do it, the owner may bring an action againft him for fo doing. It is enacted by 12 Ann. c. 18. that if any wreck happen by any fault or negligence of mafter or mariners, the mafter muft make good the lofs; but if the fame was occafioned by tempeft, enemies, *&c.* he fhall be excufed: making holes in fhips, or doing any thing wilfully tending to the lofs thereof, is by that ftatute declared felony; and by this act juftices of the peace are required to command affiftance for preferving fhips in danger of wreck on the coafts; and officers of men of war, and other fhips, are to be aiding and affifting in the preferving fuch veffels, under the penalty of 100 l. And, further, no perfon fhall enter fuch veffel without leave of her commander, or a conftable, *&c.* and perfons carrying away goods from fuch fhips, fhall pay treble value; but the perfons giving affiftance, fhall be paid by the mafter a reafonable reward for falvage, *&c.*

WRECK, in metallurgy, a veffel in which the third wafhing is given to the ores of metals.

WREN, in ornithology, the chefnut-coloured motacilla, with the wings variegated with white and grey. See the article MOTACILLA.

This is a very minute bird; we have not any in Europe that is fmaller: the head is large and round, the eyes dark, and the beak flender and brown; the tail is fhort, and generally carried erect; the head, neck, and back are of a dufky chefnut-brown; the throat is of a palifh white colour, the middle of the breaft is ftill whiter, and the lower part of it is variegated with obfcure and tranfverfe lines of black. See pl. CCXCVI. fig. 4.

WRESTLING, a kind of combat or engagement between two perfons unarmed, body to body, to prove their ftrength and dexterity, and try which can throw his opponent to the ground. See the articles EXERCISE, GAMES, *&c.*

Wreftling, *palæftra,* is an exercife of very great antiquity and fame. It was in ufe in the heroic age; witnefs Hercules, who wreftled with Antæus. See the articles PALÆSTRA and GYMNASTICS.

It continued a long time in the higheft repute, and had confiderable rewards and honours affigned it at the olympic games. It was the cuftom for the athletæ to anoint their bodies with oil, to give the lefs hold to their antagonift. See the article ATHLETÆ, *&c.*

Lycurgus ordered the fpartan maids to wreftle in public, quite naked, in order, as it is obferved, to break them of their too much delicacy and nicenefs, to make them appear more robuft, and to familiarize the people, *&c.* to fuch nudities.

WREXHAM, a market-town of Denbighfhire, in Wales, fituated twenty-three miles fouth-eaft of St. Afaph.

WRINTON, a market-town of Somerfetfhire, fituated feven miles north of Wells.

WRIST, *carpus,* in anatomy, a part of the hand confifting of eight fmall, unequal, and irregular bones, all which taken together, reprefent a fort of grotto of an irregular quadrangular figure, and connected principally with the bafis of the radius. Confidered in this manner, the whole connection of them has two fides and four edges; one of the fides is convex and external, the other concave and internal. The convexity of the outfide is pretty regular and even; but the concavity of the infide has four eminences, one at each corner. One of the four edges touches the fore-arm, and is as it were the head of the carpus; another of the edges touches the metacarpus, and may be called the bafis; the third is toward the point of the radius, and the fourth toward the point of the ulna; the firft of thefe latter two may be called the fmall edge, the latter the larger. See the article HAND.

The bones of the carpus are divided into two rows, the firft of which lies next the fore-arm, the fecond next the metacarpus; each row confifts of four bones; but the fourth of the firft row lies in a manner out of its rank. Each bone has feveral cartilaginous furfaces for their mutual articulations, and, in fome of them, for their articulations with the radius, and bones of the metacarpus and thumb.

thumb. It is to no purpose to distinguish the three ordinary dimensions in any of these bones, except one; but in most of them we may consider six sides, one external, turned towards the convex surface of the carpus; one internal, toward the concave surface; one toward the fore-arm, which may properly be called the brachial side; one toward the fingers, to be called the digital side; one toward the point of the radius, or the radial side, and one toward the point of the ulna, or the cubical side. The articulation of the bones of the carpus is triple: 1. with one another: 2. with the bones of the metacarpus, and, 3. with the cubitus.

The muscles of the carpus are six, three of which are flexors, and three extensors. The three flexors all arise from the internal condyle of the humerus; they are the radiæus internus, the ulnaris internus, and the palmaris. See the articles MUSCLE, FLEXOR, RADIÆUS, &c. The three extensors all arise from the external condyle of the humerus; they are, 1. the radiæus externus: 2. the longus and brevis, called by others bicornus, and, 3. the ulnaris externus. See the article EXTENSOR, &c.

WRIST LUXATED. See the article *Luxation of the* HAND.

WRIST FRACTURED. The bones of the wrist are very seldom subject to fracture, on account of their smallness. And when they are fractured, there is but little hopes of a cure; for the ligaments and tendons are here so numerous, and the bones so very small, that it is scarce possible to reduce them to their places, or to make them grow together again.

On this account the joint of the hand generally becomes stiff and immoveable after these accidents, or else abscesses, suppurations, fistulæ, and caries of the bones follow them; and these, on account of the softness of the bones, and the difficulty of discharging the matter, are seldom remedied, but by amputating the hand. What can be done, however, toward the curing a fracture in this part, is this; the assistant must lay hold of the hand above the wrist and below it, and extend them as far as is necessary in opposite directions; the surgeon is, while this is doing, to replace the bones with his fingers, and when they are all replaced, to bind the hand up with a proper bandage.

WRIST, in the manege. The bridle-wrist, is that of the cavalier's left hand. A horseman's wrist and his elbow should be equally raised, and the wrist should be two or three fingers above the pummel of the saddle. To ride a horse from hand to hand, *i. e.* to change hands upon one tread, you need only to turn your wrist to that side you would have the horse to turn to, without advancing your hand. But if your horse stops, you must make use of both your legs. See the articles HAND and LEG.

WRIT, in law, signifies, in general, the king's precept in writing under seal, issuing out of some court, directed to the sheriff, or other officer, and commanding something to be done in relation to a suit or action, or giving commission to have the same done. And, according to Fitzherbert, a writ is said to be a formal letter of the king in parchment, sealed with his seal, and directed to some judge, officer, or minister, &c. at the suit of a subject, for the cause briefly expressed, which is to be determined in the proper court according to law. See the articles BREVE, PRECEPT, &c.

Writs, in civil actions, are either original or judicial: original, are such as are issued out of the court of chancery, for the summoning of a defendant to appear, and are granted before the suit is commenced, in order to begin the same; and judicial writs issue out of the court where the original is returned, after the suit is begun. The originals bear date in the king's name; but judicials bear teste in the name of the chief justice or chief baron: and a writ without a teste is not held to be good, for the time may be material when it was taken out, and the same is proved thereby; also in case it issue out of the common law courts, the writ must be dated some day in term; but in chancery, writs may be issued in vacation, that court being always open: where a suit is by original, there must be fifteen days at least between the teste and return of all writs; yet by 13 Car. II. c. 2. delays in actions by reason of fifteen days between the teste and return of writs in personal actions and ejectments, are remedied. See RETURN, TESTE, &c.

As in actions, so writs are likewise real, that concern the possession of lands, called writs of entry, or of right which relate to the property, &c. and personal, relating to goods, chattels, and personal injuries: though the most common writs in use are in debt, detinue, trespass, action upon

upon the cafe, account and covenant, &c. See the articles ACTION, DETINUE, and TRESPASS.

After an action is fixed for any wrong done, or a debt or right detained, there muft be a writ taken out that is fuitable to the action, and on which it is grounded; though in fome cafes the writ may be general, and the declaration thereon fpecial: likewife four defendants can be included in one writ, but there muft be feveral warrants from the fheriff to execute the fame. See WARRANT.

All the ufual writs are to be returned and filed in due time, thereby to avoid poft terminums; and it is filing that makes them the warranty for the proceedings. Writs cannot be denied to any one, but may be abated in feveral cafes. See the articles ARRESTS, FILING, &c.

WRIT *of affiftance*, is a warrant that iffues out of the exchequer to authorize perfons to take a conftable, or other public officer, to feife goods or merchandizes prohibited and uncuftomed, &c. by virtue of which writ any perfon may, in the day-time, and in the prefence of fuch conftable, &c. break open doors, chefts, warehoufes, and other places, to fearch for and feife uncuftomed goods. There is alfo a writ of this name that is ufed to give poffeffion of land; and likewife for the general affiftance of fheriffs, &c.

WRIT *of inquiry and damages*, a judicial writ that iffues out to the fheriff upon a judgment by default, in action of the cafe, covenant, trefpafs, trover, &c. commanding him to fummon a jury to enquire what damages the plaintiff hath fuftained, occafione præmifforum; and when this is returned with the inquifition, the rule for judgment is given upon it; and if nothing be faid to the contrary, judgment is thereupon entered.

WRIT *of rebellion*, is a writ iffuing out of the court of chancery or exchequer, againft a perfon who is in contempt for not appearing in one of thefe courts, &c. See the article COMMISSION *of rebellion*.

WRITER *of the tallies*, an officer of the exchequer, being clerk to the auditor of the receipt, who writes, upon the tallies, the whole letters of the teller's bill. See the articles TALLY, EXCHEQUER, &c.

WRITING, *fcriptura*, the art or act of fignifying and conveying our ideas to others, by letters, or characters, vifible to the eye. See the articles CHARACTER, LETTER, WORD, &c.

Writing is now chiefly practifed among us by means of pen, ink, and paper; though the antients had other methods. See the articles PEN, INK, PAPER, and BOOK, BARK, STYLE, &c.

To write without blacking the fingers, Mr. Boyle directs us as follows. Prepare the paper with a fine powder made of three parts of calcined copperas, two of galls, and one of gum arabic; thofe being frefh mixed, rub them with a hare's foot into the pores of the paper, and write with fair water, and the black letters will immediately appear.

To make new writing appear old, the fame author directs to moiften it well with oil of tartar per deliquium, more or lefs diluted with water, as you defire the ink to appear more or lefs decayed.

We may write without ink or its materials. For this purpofe take a fine powder of calcined hartfhorn, of clean tobacco-pipes, or rather of mutton-bones burnt to a perfect whitenefs, and rub it upon the paper, and then write with a filver bodkin, or the like.

WRONG, in a logical fenfe. See ERROR, FALSHOOD, TRUTH, &c.

WRONG, in a legal fenfe, the fame with injury, or tort. See the articles INJURY, JUSTICE, TORT, RIGHT, &c.

WROTHAM, a market-town of Kent, fituated ten miles weft of Maidftone.

WRY-NECK, *jynx*, in ornithology. See the article JYNX.

WRY-NECKED. See the article NECK.

WURTEMBURG, or WIRTENBURG DUTCHY, in Germany, is the north part of the circle of Swabia, bounded by the palatinate of the Rhine and Franconia, on the north; by Oetingen and the bifhopric of Aufburg, on the eaft; by the territories of Ulm and Furftemburg, on the fouth; and by the territories of Baden, on the weft; being feventy miles long, and almoft as much in breadth.

WURTZBURG, a city of Germany, in the circle of Franconia, capital of the bifhopric of that name, fituated on the river Maine, in eaft long. 9° 50′, north lat. 49° 46′.

WYCH-HOUSE, a houfe in which falt is boiled. See the article SALT.

WYDRAUGHT, a water courfe, or water paffage, to carry off the filth of a houfe, properly a fink, or common fhore. See the articles SEWER and CLOACA.

WYE, a market-town of Kent, fituated twenty miles fouth-eaft of Maidftone.

WYE is alfo a river of Wales, which, rifing on the confines of Cardiganfhire, and running

running fouth-eaft, divides the counties of Radnor and Brecknock; then croffing Herefordfhire it turns fouth, and falls into the mouth of the Severn at Chepftow.

WYKE, antiently fignified a farm, hamlet, or little village. See the articles FARM, HAMLET, and VILLAGE.

WYNENDALE, a town of the auftrian Netherlands, in the province of Flanders, fituated eleven miles fouth-weft of Bruges.

WYTE, or WITE, in our antient cuftoms, a pecuniary penalty or mulct. The Saxons had two kinds of punifhments, were and wyte; the firft for the more grievous offences. See WERE. The wyte was for the lefs heinous ones. It was not fixed to any certain fum, but left at liberty to be varied according to the nature of the cafe. Hence alfo wyte, or wittree, one of the terms of privilege granted to our fportfmen, fignifying a freedom or immunity from fines or amerciaments.

# X.

X, or x, is the twenty-fecond letter of our alphabet, and a double confonant. It was not ufed by the Hebrews or antient Greeks; for as it is a compound letter, the antients, who ufed great fimplicity in their writings, made ufe of, and expreffed, this letter by its component letters *c s*. Neither have the Italians this letter, but exprefs it by *ff*. X begins no word in our language, but fuch as are of greek original, and is in few others, but what are of latin derivation, as *perplex*, *reflexion*, *defluxion*, &c. We often exprefs this found by fingle letters, as *cks* in *backs*, *necks*; by *ks*, in *books*, *breaks*; by *cc*, in *accefs*, *accident*; by *ct*, in *action*, *unction*, &c. The Englifh and French pronounce it like *cs* or *ks*; the Spaniards like *c* before *a*, viz. *Alexandro*, as if it were *Alecandro*. In numerals it expreffeth 10, whence in old roman manufcripts it is ufed for *denarius*; and as fuch feems to be made of two V's placed one over the other. When a dafh is added over it, thus $\overline{X}$, it fignifies ten thoufand.

XACA, a port-town of Sicily in the province of Mazara, forty miles fouth of Palermo: eaft longitude 13°, north latitude 37°.

XALISCO, a city of Mexico, in America, fituated near the Pacific ocean, four hundred miles weft of the capital city of Mexico: weft longitude 110°, and north latitude 22° 20′.

XANSI, a province of China, bounded by the province of Peking on the eaft, by the great wall on the north; by the province of Honan on the fouth, and by the river Crocei, which divides it from the province of Xenfi, on the weft.

XANTHICA, in antiquity, a macedonian feftival, fo called becaufe it was obferved in the month Xanthus, which, as Suidas tells us, was the fame with April. At this time the army was purified by a folemn luftration, in the following manner: they divided a bitch into two halves, one of which, together with the entrails, was placed upon the right hand, the other upon the left; between thefe the army marched in this order; after the arms of the macedonian kings came the firft part of the army; thefe were followed by the king and his children, after whom went the life-guards, and the reft of the army. This done, the army was divided into two parts, one of which being fet in array againft the other, there followed a fhort encounter, in imitation of a fight.

XANTHIUM, the LESSER BUR-DOCK, in botany, a genus of the monoecia-pentandria clafs of plants, the compound flower of which is uniform, tubulous, equal, and difpofed in the form of a hemifphere; the partial flower is monopetalous, tubulous, funnel-fafhioned, erect, and quinquifid; the fruit is a dry, ovato-oblong, bilocular berry, bifid at the apex, hairy, and covered over with hooked prickles; the feed is fingle, oblong, convex on one fide, and plane on the other.



XAN-

XANTUM, a province of China, in Asia, bounded by the Kang sea on the north, by the gulph of Nankin on the east, by the province of Nankin on the south, and by the province of Pekin on the west.

*St.* XAVIER, a town of the province of La Plata, or Guayra, in South America, situated on the confines of Brasil, two hundred miles west of Rio Janeiro: west long. 50°, south lat. 24°.

XENODOCHUS, an ecclesiastical officer in the greek church, the same with hospitaller; or a person who takes care of the reception and entertainment of strangers.

XENSI, a province of China, bounded by the great wall on the north, by the province of Xansi on the east, by the province of Suchuen on the south, and by Tibet on the west.

XERANTHEMUM, or XERANTHEMOIDES, the AUSTRIAN SNEEZE-WORT, in botany, a genus of the syngenesia-polygamia-superflua class of plants; the compound flower of which is unequal, and consists of many tubulous hermaphrodite floscules placed on the disc, and also a few female tubulated ones on the verge; the seeds are oblong, coronated, and contained in the cup. See plate CCCII. fig. 6.

XEREZ DE LA FRONTIERA, a town of Spain, in the province of Andalusia, twenty miles north of Cadiz.

XEREZ DE GUADIANA, a town of Spain, in the province of Andalusia, situated on the river Guadiana: west long. 8° 14′, north lat. 37° 15′.

XEROPHAGIA, in church-history, the eating of dried foods: so the antient christians called certain fast-days, on which they eat nothing but bread and salt, and drank only water: sometimes they added pulse, herbs, and fruits. This sort of fasting was observed chiefly in the holy-week, out of devotion, and not by obligation.

XESTA, an attic measure of capacity. See the article MEASURE.

XIMENIA, in botany, a genus of plants, the characters of which are not perfectly ascertained: the calyx is a perianthium, composed of three small, cordated, and deciduous leaves; the corolla is formed of a single petal, of a campanulated figure, divided at the edge into three erect, oblong, obtuse segments; the germen is small, and of a suboval figure; the fruit is an oval drupe, containing one cell; the seed is oval, unilocular, and smooth.

XICHU, a city of China, in the province of Huguam: east longitude 112°, north latitude 27°.

XINYAN, or CHINIAN, a city of Asia, in the province of Laotung: east long. 120°, north lat. 31°.

XIPHIAS, the SWORD-FISH, in ichthyology, a genus of the acanthopterigious class of fishes. The rostrum, or extremity of the head of the xiphias, is continued forward, with an extremely long point, of a depressed, or somewhat flatted figure, resembling the blade of a sword, and of a bony structure; the lower jaw is acute, and of somewhat a triangular figure; the body is oblong, and of a roundish figure, and is considerably thick in proportion to its length; the back is convex, and the sides are rounded; there are no belly-fins, and on the back there is only one fin, which is very long, and lowest in the middle; the branchiostege membrane, on each side, contains only eight bones. About fifteen feet in length is the size of a moderately large one, but not unfrequently is it met with much bigger. See plate CCCII. fig. 4.

XIPHIAS is also a fiery meteor, in form of a sword. It differs from the acontias in this, that the latter is longer, and more like a dart; and the former shorter and broader in the middle.

XIPHIUM, in botany, a name given by some to a plant otherwise called iris. See the article IRIS.

XIPHOIDES, in anatomy, a cartilage adhering to the sternum; called also cartilago ensiformis. See STERNUM.

XUCAR, a river of Spain, which rises in New Castile, and, having run through that province, crosses the province of Valencia, and falls into the Mediterranean, twenty miles south of the city of Valencia.

XYLARIA, in botany, a genus of fungusses, consisting of branches or stalks, of a woody structure, tough, firm, and hard, and of an uneven surface. These fungi produce separate male and female flowers: the male flowers consist only of antheræ of an oblong figure, supported on very short stamina, and placed only on the upper parts of the plant. The female flowers are lodged in cavities, or cells, in the lower parts of the plant, and consist

confiſt of placentæ, of a roundiſh figure, and gelatinous ſubſtance, to which are affixed great numbers of roundiſh ſeeds.

XYLO-ALOES, or ALOE-WOOD, in pharmacy. See the article ALOE.

This drug is diſtinguiſhed into three ſorts, the calambac, the common lignum aloes, and calambour.

The calambac, or fineſt aloes-wood, called by authors lignum aloes præſtantiſſimum, and by the Chineſe ſukhiang, is the moſt reſinous of all the woods we are acquainted with: it is of a light ſpongy texture, very porous, and its pores ſo filled up with a ſoft and fragrant reſin, that the whole may be preſſed and dented by the fingers like wax, or moulded about by chewing in the mouth, in the manner of maſtich. This kind, laid on the fire, melts in great parts like reſin, and burns away in a few moments, with a bright flame and perfumed ſmell. Its ſcent, while in the maſs, is very fragrant and agreeable; and its taſte acrid and bitteriſh, but very aromatic and agreeable: it is ſo variable in its colour, that ſome have divided it into three kinds, the one variegated with black and purple; the ſecond, with the ſame black, but with yellowiſh inſtead of purple; and the third, yellow alone, like the yolk of an egg: this laſt is the leaſt ſcented of the three; the ſubſtance, however, in them all, is the ſame in every reſpect, except their colour. It is brought from Cochinchina.

The lignum aloes vulgare is the ſecond in value. This is of a more denſe and compact texture, and conſequently leſs reſinous than the other: there is ſome of it, however, that is ſpongy, and has the holes filled up with the right reſinous matter; and all of it, when good, has veins of the ſame reſin in it. We meet with it in ſmall fragments, which have been cut and ſplit from larger; theſe are of a tolerably denſe texture, in the more ſolid pieces, and of a duſky brown colour, variegated with reſinous black veins. It is in this ſtate very heavy, and leſs fragrant than in thoſe pieces which ſhew a multitude of little holes, filled up with the ſame blackiſh matter that forms the veins in others. The woody part of theſe laſt pieces is ſomewhat darker than the other, and is not unfrequently purpliſh, or even blackiſh. The ſmell of the common aloe-wood is very agreeable, but not ſo ſtrongly perfumed as the former. Its taſte is ſomewhat bitter and acrid, but very aromatic. This wood is alſo brought from Cochinchina, and ſometimes from Sumatra.

The calambour, or, as ſome write it, calambouc, is alſo called agallochum ſylveſtre, and lignum aloes mexicanum. It is a light and friable wood, of a duſky and often mottled colour, between a duſky green black, and a deep brown. Its ſmell is fragrant and agreeable, but much leſs ſweet than that of either of the others; and its taſte bitteriſh, but not ſo much acrid or aromatic as either of the two former. We meet with this very frequent, and in large logs, and theſe ſometimes entire, ſometimes only the heart of the tree, the cortical part being ſeparated. This is brought from the iſland of Timor, and is the aloe-wood uſed by the cabinet-makers and inlayers.

The Indians uſe the calambac by way of incenſe, burning ſmall pieces of it in the temples of their gods; and ſometimes their great people burn it in their houſes, in times of feaſting. It is eſteemed a cordial, taken inwardly; and they ſometimes give it in diſorders of the ſtomach and bowels, and to deſtroy worms. A very fragrant oil may be procured from it, by diſtillation, which is recommended in paralytic caſes, from five to fifteen drops. It is at preſent, however, but little uſed, and would ſcarce be met with any where in the ſhops, but that it is an ingredient in ſome of the old compoſitions.

XYLO-BALSAMUM, a name which naturaliſts give to the wood of the tree which yields that precious gum known to the Latins by the name of opobalſamum, and to us by the balm of gilead. See the article BALSAM.

We have branches of this tree brought us from Cairo; they are very ſtrait, brittle, unequal, and full of knots; their bark reddiſh without, and greeniſh within. The xylo-balſamum is reputed good to ſtrengthen the brain and ſtomach, and to expel poiſon.

XYLOCASIA, in the materia medica, the ſame with the caſſia ligna. See CASSIA.

XYLON, the PRICKLY COTTON-TREE, in botany, a genus of the polyandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle petal, divided into five oval, hollow, patent ſegments; the fruit is a large, oblong, turbinated capſule, formed of five woody valves, and containing five cells; the ſeeds are roundiſh,

roundiſh, and fixed to a columnar pentagonal receptacle, and have a quantity of fine down, or cotton, adhering to them.

XYLON is alſo a name given to the goſſypium. See the articles GOSSYPIUM and COTTON.

XYLOSTEUM, in botany, a name given by Tournefort to the lonicera of Linnæus. See the article LONICERA.

XYNOECIA, in grecian antiquity, an anniverſary feaſt, obſerved by the Athenians, in honour of Minerva, upon the ſixteenth of Hecatombæon, in memory that, by the perſuaſion of Theſeus, they left their country-ſeats, in which they lay diſperſed here and there in Attica, and united together in one body.

XYRIS, in botany, a genus of the triandria-monogynia claſs of plants, the flower of which conſiſts of three plain, patent, large, crenated petals, with narrow ungues, of the length of the cup; The fruit is a roundiſh, trilocular, trivalvar capſule, within the cup, with a great number of very ſmall ſeeds. See plate CCCII. fig. 3.

XYSTARCHA, in antiquity, the maſter or director of the xyſtus. In the greek gymnaſium, the xyſtarcha was the ſecond officer, and the gymnaſiarcha the firſt; the former was his lieutenant, and preſided over the two xyſti, and all exerciſes of the athletæ therein.

XYSTUS, among the Greeks, was a long portico, open or covered at the top, where the athletæ practiſed wreſtling and running: the gladiators, who practiſed therein, were called xyſtici.

Among the Romans, the xyſtus was only an ally, or double row of trees, meeting like an arbour, and forming a ſhade to walk under.

# Y.

Y, or y, the twenty-third letter of our alphabet: its ſound is formed by expreſſing the breath with a ſudden expanſion of the lips from that configuration by which we expreſs the vowel *u*. It is one of the ambigenial letters, being a conſonant in the beginning of words, and placed before all vowels, as in *yard, yield, young, &c.* but before no conſonant. At the end of words it is a vowel, and is ſubſtituted for the ſound of *i*, as in *try, deſcry, &c.* In the middle of words it is not uſed ſo frequently as *i* is, unleſs in words derived from the greek, as in *chyle, empyreal, &c.* though it is admitted into the middle of ſome pure engliſh words, as in *dying, flying, &c.* The Romans had no capital of this letter, but uſed the ſmall one in the middle and laſt ſyllables of words, as in *coryambus, onyx, martyr.*

Y is alſo a numeral, ſignifying 150, or, according to Baronius, 159; and with a daſh a-top, as $\overline{Y}$, it ſignified 150,000.

YACHT, or YATCH, a veſſel with one deck, carrying from four to twelve guns. See the article SHIP.

YARD, a meaſure of length uſed in England and Spain, chiefly to meaſure cloth, ſtuffs, &c. See the article MEASURE.

YARD, in anatomy. See PENIS.

YARD-LAND is taken to ſignify a certain quantity of land, in ſome counties being fifteen acres, and in others twenty; in ſome twenty-four, and in others thirty and forty acres.

YARDS *of a ſhip*, are thoſe long pieces of timber which are made a little tapering at each end, and are fitted each athwart its proper maſt, with the ſails made faſt to them, ſo as to be hoiſted up, or lowered down, as occaſion ſerves. They have their names from the maſts unto which they belong. As for the length of the main-yard, it is uſually five-ſixths of the length of the keel, or ſix ſevenths of the length of the main-maſt. Their thickneſs is commonly $\frac{3}{4}$ of an inch for every yard in length. The length of the main-top-yard is two fifths of the main-yard; and the fore-yard four-fifths thereof. The ſprit-ſail-yard, and croſs jack-yard are half the mizzen-yard; and the thickneſs of the mizzen-yard and ſprit-ſail-yard is half an inch for every yard in length. All ſmall yards are half the great yards from cleat to cleat. When a yard is down a portlaſt, it gives the length of all top-ſail-ſheets, lifts, ties, and burnt-lines, as alſo of the leech-lines and halliards, meaſuring from the hounds to the deck: and when it is hoiſted,

hoisted, it gives the length of clew lines, clew-garnets, braces, tackles, sheets, and bow-lines.

There are several sea-terms relating to the management of the yards; as, square the yards; that is, see that they hang right a-cross the ship, and no yard-arm traversed more than another: top the yards, that is, make them stand even. To top the main and fore-yards, the clew-lines are the most proper; but when the top-sails are stowed, then the top-sail-sheets will top them.

YARD-ARM is that half of the yard that is on either side of the mast, when it lies athwart the ship.

YARDS also denotes places belonging to the navy, where the ships of war, &c. are laid up in harbour. There are, belonging to his majesty's navy, six great yards, *viz.* Chatham, Deptford, Woolwich, Portsmouth, Sheerness, and Plymouth; these yards are fitted with several docks, wharfs, lanches, and graving places, for the building, repairing, and cleaning of his majesty's ships; and therein are lodged great quantities of timber, masts, planks, anchors, and other materials: there are also convenient store-houses in each yard, in which are laid up vast quantities of cables, rigging, sails, blocks, and all other sorts of stores, needful for the royal navy.

YARE, among sailors, implies ready or quick: as, be yare at the helm; that is, be quick, ready, and expeditious at the helm. It is sometimes also used for bright by seamen: as, to keep his arms yare; that is, to keep them clean and bright.

YARE, a river of Norfolk, which runs from west to east, through that county, passing by Norwich, and falling into the German-sea at Yarmouth.

YARMOUTH, a borough and port-town of Norfolk, situated on the German-sea, at the mouth of the river Yare, twenty miles east of Norwich.

It sends two members to parliament.

YARMOUTH is also a borough-town of the Isle of Wight, in Hampshire, situated on the north-west coast of the Island, six miles west of Newport.

It sends two members to parliament.

YARN, wool or flax, spun into thread, of which they weave cloth. See the articles CLOTH, WOOL, &c.

Yarn is ordered after the following manner: after it has been spun upon spindles, spools, or the like, they reel it upon reels, which are hardly two feet in length, and have but two contrary cross-bars, being the best, and the least liable to ravelling. In reeling of fine yarn, the better to keep it from ravelling, you must, as it is reeled, with a tye-band of big-twist, divide the slipping or skain into several leys, allowing to every ley eighty threads, and twenty leys to every slipping, if the yarn is very fine; otherwise less of both kinds. The yarn being spun, reeled, and in the slippings, the next thing is to scour it. In order to fetch out the spots, it should be laid in lukewarm water for three or four days, each day shifting it once, wringing it out, and laying it in another water of the same nature: then carry it to a well or brook, and rinse it till nothing comes from it but pure clean water: that done, take a bucking-tub, and cover the bottom thereof with very fine ashen ashes; and then having opened and spread the slippings, lay them on those ashes, and put more ashes above, and lay in more slippings, covering them with ashes as before; and thus lay one upon another, till all the yarn be put in: afterwards cover the uppermost yarn with a bucking cloth, and, in proportion to the bigness of the tub, lay therein a peck or two more of ashes: this done, pour upon the uppermost cloth a great deal of warm water, till the tub can receive no more, and let it stand so all night. Next morning you are to set a kettle of clean water on the fire; and when it is warm, pull out the spiggot of the bucking tub, to let the water run out of it, into another clean vessel; as the bucking-tub wastes, fill it up again with the warm water on the fire: and as the water on the fire wastes, so likewise fill that up with the lye that comes from the bucking-tub; ever observing to make the lye hotter and hotter, till it boils: then you must, as before, ply it with the boiling lye at least four hours together, which is called the driving of a buck of yarn.

All this being done, for the whitening of it, you must take off the bucking cloth; then putting the yarn with the lye-ashes into large tubs, with your hands labour the yarn, ashes, and lye pretty well together; afterwards carry it to a well, or river, and rinse it clean; then hang it upon poles in the air all day, and in the evening take the slippings down, and lay them in water all night; the next day hang them up again, and throw water upon

them

them as they dry, obferving to turn that fide outmoft which whitens floweft. After having done this for a week together, put all the yarn again into a bucking-tub, without afhes, covering it as before with a bucking-cloth; lay thereon good ftore of frefh afhes, and drive that buck, as before, with very ftrong boiling lye, for half a day, or more; then take it out, and rinfe it, hanging it up, as before, in the day-time, to dry, and laying it in water at night, another week: laftly, wafh it over in fair water, and fo dry it up. Your yarn being thus fcoured and whitened, wind it up into round balls of a moderate fize. See the article REEL.

Cable-yarn pays, on importation, for the hundred weight 7 s. $3\frac{5}{100}$ d. there is no drawback on exportation. Camel or mohair-yarn pays on importation for the hundred weight $5\frac{77\frac{1}{2}}{100}$ d. and draws back $5\frac{6\frac{1}{4}}{100}$ d. Cotton-yarn, not of the Eaft-Indies, on importation, pays per pound $2\frac{87\frac{1}{4}}{100}$ d. and on exportation draws back $2\frac{58\frac{3}{4}}{100}$ d. Cotton-yarn of the Eaft-Indies, on importation, pays per pound $4\frac{56}{100}$ d. and on exportation draws back $4\frac{27\frac{1}{2}}{100}$ d. Grogram-yarn, on importation, pays per pound $6\frac{93}{100}$ d. and on exportation draws back $6\frac{7\frac{1}{2}}{100}$ d. Irifh yarn, in packs containing four hundred weight, at fix fcore pound to the hundred, if by certificate, is free from any duty on importation. Sail-yarn, on importation, pays per pound $1\frac{43\frac{5}{8}}{100}$ d. and on exportation draws back $1\frac{29\frac{3}{8}}{100}$ d. For every pound weight of french, dutch, mufcovia, or fpruce, and all other raw linen-yarn, there is a duty of 1 d. on importation; and no draw-back on exportation. Wick-yarn on importation, pays, the dozen pound, 2 s. $1\frac{85\frac{1}{4}}{100}$ d. and on exportation draws back 1 s. $11\frac{28\frac{3}{4}}{100}$ d. Woollen or bay-yarn, on importation, pays the hundred 12 s. 10 d. and on exportation draws back 11 s. 3 d. Worfted-yarn, being two or more threads twifted or thrown, on importation, pays the pound $2\frac{87\frac{1}{4}}{100}$ d. and on exportation draws back $2\frac{58\frac{3}{4}}{100}$ d.

YARRINGLE, a kind of inftrument, or reel, on which hanks of yarn are wound, to clues or balls. See REEL.

YARUM, a market-town of the north riding of Yorkfhire, fituated on the river Tees, thirty miles north of York.

YAWNING, *ofcitatio*, an involuntary opening of the mouth, occafioned by a vapour or ventofity endeavouring to efcape, and generally witneffing an irkfome wearinefs, or an inclination to fleep. Yawning, according to Boerhaave, is performed by expanding at one and the fame time all the mufcles capable of fpontaneous motion; by greatly extending the lungs; by drawing in gradually and flowly a large quantity of air; and gradually and flowly breathing it out, after it has been retained for fome time, and rarified; and then reftoring the mufcles to their natural ftate. Hence the effect of yawning is to move, accelerate, and equally diftribute all the humours thro' all the veffels of the body, and confequently to qualify the mufcles and organs of fenfation for their various functions. Sanctorius obferves, that a great deal is infenfibly difcharged, when nature endeavours to get rid of the retained perfpirable matter, by yawning and ftretching of the limbs. To thefe a perfon is moft inclined juft after fleep, becaufe, a greater quantity going off by the pores of the fkin, than at other times, whenfoever a perfon wakes, the increafed contraction that then happens, clofes a great deal of the perfpirable matter in the cutaneous paffages, which will continually give fuch irritations, as excite yawning and ftretching; and fuch motions, by fhaking the membranes of the whole body, and fhifting the contacts of their fibres, and the inclofed matter, by degrees throw it off. Hence we fee the reafon, why healthful, ftrong people are moft inclined to fuch motions, becaufe they perfpire moft in time of fleep, and therefore have more of the perfpirable matter to lodge in the pores, and greater irritations thereunto.

YAWS, in the fea-language. A fhip is faid to make yaws, when fhe does not fteer fteady, but goes in and out when there is a ftiff gale.

YAWS, a diftemper endemial to Guinea and the hotter climates in Africa. It makes its firft appearance in little fpots on the cuticle, not bigger than a pin's point, which increafe daily, and become protuberant, like pimples. Soon after, the cuticle frets off, and then, inftead of pus or ichor, there appears white floughs or fordes, under which is a fmall red fungus. Thefe increafe gradually, fome to the fize of a fmall wood-ftrawberry, others to that of a rafpberry, others again exceed the largeft mulberry, which in fhape they very much refemble. In the mean time the black hair growing in the yaws turns to a tranfparent white. It is not eafy to determine the exact time which the yaws take in going through their different ftages. Lufty well fed negroes have had feveral yaws as big as a mulberry in a month's time, whereas the low in flefh, with a fcanty allowance have paffed three months without their growing to the fize of a ftrawberry. They appear in all parts of the body, but are moft plentiful, and of the largeft fize about the groin, privy parts, anus, armpits, and face: they are largeft when feweft in number, and *vice verfa.* They are not painful, unlefs handled roughly, nor caufe a lofs of appetite. They continue long without any fenfible alteration; and fome are of opinion, that as foon as the fungufes become dry, the infection is exhaufted.

The yaws are not dangerous, if the cure is fkillfully managed at a proper time. But if the patient has been once falivated, or has taken any quantity of mercury, and his fkin once cleared thereby, the cure will be very difficult, if not impracticable. The following form of medicine is recommended as a cure: take of flowers of fulphur, one fcruple; of camphor diffolved in fpirits of wine, five grains; of theriaca andromachi, one dram; and as much of fyrup of faffron as will make a bolus. Let the bolus be taken at going to reft, which muft be repeated for a fortnight or three weeks, till the yaws come to the height. Then throw the patient into a gentle falivation, with calomel given in fmall dofes, without farther preparation. After falivation, fweat the patient twice or thrice, on a frame or chair, with fpirit of wine, and give the following electuary, *viz.* of æthiops mineral, one ounce and a half, of gum guaiacum, half an ounce; theriaca andromachi, and conferve of red rofes, of each one ounce; oil of faffafras, twenty drops; and as much of fyrup of faffron as is requifite for an electuary. Of this let two drams be taken in the morning and at night. He may likewife drink the decoction of guaiacum and faffafras fermented with molaffes, for his conftant drink, while the electuary is taking, and a week or a fortnight after the electuary is fpent. Sometimes there remains one large yaw, high and knobed, red and moift; this is called the mafter-yaw. This muft be confumed an eighth or a tenth part of an inch below the fkin, with corrofive red mercury, and burnt alum, of each an equal quantity, and digefted with one ounce of yellow bafilicon, and one dram of red corrofive mercury, and cicatrized with lint preffed out of fpirit of wine, and with the vitriol-ftone.

YAXLEY, a market-town of Huntingtonfhire, twelve miles north of Huntington.

YEAR, *annus*, the time the fun takes to go thro' the twelve figns of the zodiac. See the articles ZODIAC and EARTH.

This is properly the natural or tropical year, and contains 365 days, 5 hours, and 49 minutes. As for the gregorian, the civil, the folar or aftronomical, the biffextile, and platonic years, fee them under the articles GREGORIAN, CIVIL, &c.

The julian year derives both its name and inftitution from Julius Cæfar the dictator; for before his time the form of the roman year was fo corrupted by the indifcretion of the pontiffs, in whofe hands the power of intercalation was lodged, that the winter-months fell back to the autumn, and thofe of autumn to the fummer. To remedy thefe inconveniences, the dictator not only added to that year, in which he fet about the reformation of the kalendar, the common intercalation of 23 days, between the 23d and 24th days of February, purfuant to Numa Pompilius's inftitution, but likewife 67 days more between November and December, fo that this year contained 445 days. This done, he inftituted a folar year of 365 days and 6 hours, purfuant to what he had learned from the Egyptians, and every fourth year he ordered a day to be added. See GREGORIAN, BISSEXTILE, and EMBOLISMIC.

The Arabs, Saracens, and Turks count their year by the motion of the moon, making it confift of 12 moons or months, whereof fome have 30, and fome 29 days, alternately; and thefe altogether make

354 days, and conftitute a common lunar year; and 354 days, 8 hours, 48 minutes, 38 feconds, 12 thirds, conftitute what is called a lunar aftronomical year. The Greeks counted their year by the motion of both fun and moon; and finding that there was 11 days difference between the lunar and folar years, at firft they added an intercalary month every two years, containing 22 days. Afterwards confidering the 6 hours alfo, they put their embolifm off 4 years, and then making the three firft years to contain three hundred and fifty-four days each, this made the fourth year to have 399 days: and to make this intercalation the more remarkable, they inftituted the olympic games on every fuch fourth year, whence came the computation by olympiads. See the article OLYMPIAD.

The Egyptians had two forts of years, the erratic and the fixed, or actiac: the erratic was called the nabonaffarean, from the epocha which takes its rife from Nabonaffar king of the Chaldees. As it neglects the 6 hours, which in the julian form make a leap day once in four years, its beginning anticipates the julian every fourth year by a day, and therefore it is juftly called erratic. The anticipation of one day in four years gains of the julian years one in 1460, fo that 1461 nabonaffarean years make but 1460 julian years. The fixed Egyptian year obferves the julian form of 365 days and 6 hours, making a leap day of the fix hours once in four years. It differs from the julian in this, that its months are the fame with thofe of the nabonaffarean, that it begins on Aug. 29, inftead of January 1; or on Aug. 30, if it be a leap-year; that it takes in the leap-day, not in February, but at the end of the year. See the articles EPOCHA and INTERCALARY.

The perfian erratic year goes by the name yezdegerdic, by reafon that the perfian epocha commences from the death of Yezdegird, the laft perfian king, who was killed by the Saracens. It confifts of twelve months, containing thirty days each, and five fupernumerary ones; fo that it differs from the nabonaffarean only in the names of the months, and the commencement of the epocha. See MONTH.

The gelalean year, ufed alfo by the Perfians, is very well adapted to the folar motions. It takes in a leap-day every fourth year, but every fixth or feventh turn it throws it forward to the fifth year, by which means the equinoxes and folftices are fixed to almoft the fame days of the months. The fyriac year confifts of 365 days and 6 hours, being divided into 12 months of equal extent with thofe of the julian year, to which they correfpond: this year begins Octofter 1, fo that the month called Tifhrim agrees with our October.

The aftronomical year is two-fold, *viz.* the tropical and fidereal: by the latter is meant that fpace of time which the fun takes in departing from a fixed ftar, and returning to the fame again. This year confifts of 365 days, 6 hours, and 10 minutes.

As the form of the year is various among different nations, fo likewife is the beginning: the Jews began their ecclefiaftical year with the new moon of that month whofe full moon happens next after the vernal equinox; and every feventh year they kept as a fabbatic year, during which they let their land lie at reft. The antient jewifh year was made to agree with the folar year, by the adding of 11, and fometimes of 12 days, at the end of the year, or by an embolifmic month. The beginning of the athenian or attic year was reckoned from that new moon, the full moon of which comes next after the fummer folftice. The macedonian lunar year agrees with the athenian, excepting that the former takes its beginning, not from the fummer-folftice, but from the autumnal equinox. The ethiopic year is a folar year, agreeing with the actiac or fixed egyptian year, except in this, that the names of the months are different, and that it commences, with the egyptian year, on Aug. 29, of the julian year. The arabian or mahometan year is called alfo that of the hegira, becaufe the calculation of thefe years runs from the epocha of the hegira, when Mahomet fled from Mecca to Medina: they had twelve civil months in a year, which contained 29 and 30 days, by turns, abating for their leap-years, in which the month Dulheggia has always 30. See HEGIRA.

The Mahometans begin their year when the fun enters aries; the Perfians, in the month anfwering to our June; the Chinefe, and moft of the Indians, begin it with the firft moon in March: at Rome there are two ways of computing the year, the one beginning at the nativity of our Lord, which the notaries ufe; the other in March, on occafion of the incarnation, and it is from this the bulls are dated. The civil or legal year, in England, as well as the hiftorical year, commences Jan. 1, by the late

late act for the alteration of the style: the church, as to her solemn service, begins the year on the first Sunday in Advent, which is always that next St. Andrews's day.

YEAR AND DAY, in law, signifies a certain time that by law determines a right, or works prescription in divers cases; as in the case of an estray, if the owner do not challenge it within that time, it becomes forfeited to the lord; so of a wreck, &c. The like time is given to prosecute appeals in; and where a person wounded, dies in a year and a day after the wound received, it makes the offender guilty of murder. See ESTRAY, &c.

There is also year and day and waste, which is taken to be part of the king's prerogative, whereby he challenges the profits of the lands and tenements for a year and a day, of those that are attainted of petty treason or felony; and the king may cause waste to be made on the lands, &c. by destroying the houses, ploughing up the meadows and pastures, rooting up the woods, &c. unless the lord of the fee agrees with him for the redemption of such waste.

YEARN, in hunting, signifies to bark as beagles properly do at their prey.

YELLOW, one of the original colours of light. See COLOUR and LIGHT.

YELLOW, in dying, is one of the five simple and mother colours. See the articles COLOUR and DYING.

For the finest yellows, they first boil the cloth or stuff in alum or pot-ashes, and give the colour with weld or wold.

Likewise turmeric gives a good yellow, though not the best.

There is also an indian wood, that gives a yellow colour bordering on gold. There is another sort of yellow, made of savory; but this is inferior to them all.

With yellow, red of madder, and that of goat's hair prepared with madder, are made the gold yellow, aurora, thought-colour, macarate, isabella, chamoise-colour, which are all casts or shades of yellow.

Painters or enamellers make their yellow of masticote, which is cerufs raised to a yellow colour by the fire, or with oker. Limners and colourers make it with saffron, french berries, orcanette, &c. Mr. Boyle tells us a most beautiful yellow may be procured by taking good quicksilver, and three or four times its weight of oil of vitriol, and drawing off, in a glass-retort, the saline menstruum from the metalline liquor, till there remains a dry snow white calx at the bottom; on pouring a large quantity of fair water on this, the colour changes to an excellent light yellow.

He says, he fears this colour is too costly to be used by painters: and he does not know how it would agree with every pigment, especially oil-colours.

YELLOWS, a disease in a horse, much the same with that called the jaundice in man. See the article JAUNDICE.

There are two kinds of it, the yellow and the black. The yellow is a very frequent disorder, say the farriers, arising from obstructions in the gall-pipe, or the little ducts opening into the same, occasioned by viscid or gritty matter lodged therein, or a plenitude and compression of the neighbouring blood-vessels, by means whereof the matter that should be turned into gall, is taken up by the vein, and carried into the mass of blood, which it tinctures yellow, so that the eyes, inside of the lips, and other parts of the mouth capable of shewing the colour, appear yellow. The effect whereof is, that a horse will be dull, heavy, and low-spirited, easily jaded by the least labour or exercise, &c. The black is known by other symptoms: the whites of the eyes, mouth, and lips turn to a dusky colour, and not so clear and sanguine as before. For the cure of this disease, we are directed to dissolve an ounce of mithridate in a quart of ale, or beer, and to give it the horse lukewarm; or instead of mithridate, two ounces of venice-treacle; and if that is not to be had, three spoonfuls of common treacle.

This distemper is also incident to black cattle. The cure is, to bleed them in the ears, eyes, and in the tail; to put salt into their ears, and to rub them between your hands: and being blooded, give them two handfuls of salt down their throats, dry over night. In the morning let them have fenugreek, turmeric, long-pepper, annise-seed, and liquorice, but two penny-worth in all, made into a powder, and given in a quart of ale milk-warm.

YELLOW-HAMMER, in ornithology, a species of frangilla, with a yellow head and a greyish yellow body. See the article FRANGILLA.

This is somewhat larger than the common sparrow, and is an extremely beautiful bird: the head is large, the eyes have a hazel coloured iris, the ears are patulous, the beak is robust and conic, and the sides of the under chap of it are com-

compreſſed, and of a ſingular form; the throat and belly is yellow, the breaſt has a rediſh tinge mixed with that colour, the ſhoulders are of a mixed green and grey, and the feathers which cover the body are black in their middle, but their edges have a tinge of green.

YEOMAN, the firſt or higheſt degree among the plebeians of England, next in order to the gentry. See the articles GENTLEMAN and COMMONS.

The yeomen are properly freeholders, who having land of their own, live on good huſbandry.

YEOMAN is alſo a title of office in the king's houſhold, of a middle place or rank between an uſher and a groom. See the articles USHER and GROOM.

YEOMAN *of the guard* were antiently two hundred and fifty men of the beſt rank under gentry, and of larger ſtature than ordinary, each being required to be ſix feet high.

At preſent there are but one hundred yeomen in conſtant duty, and ſeventy more not in duty; and as any of the hundred dies, his place is ſupplied out of the ſeventy.

They go dreſſed after the manner of king Henry VIII's time. They formerly had diet as well as wages, when in waiting, but this was taken off in the reign of queen Anne.

YEOVIL, a market-town of Somerſetſhire, ſituated eighteen miles ſouth of Wells.

YERKING, in the manege, is when a horſe ſtrikes with his hind-legs, or flings and kicks back with his whole hind quarters, ſtretching out the two legs nearly together, and even to their full extent. See the article AIR and LEAP.

YEST, YEAST, or BARM, a head, or ſcum riſing upon beer or ale, while working or fermenting in the vat. See BREWING, MALT-LIQUORS, &c.

It is uſed for a leven or ferment in the baking of bread, as ſerving to ſwell or puff it up very conſiderably in a little time, and to make it much lighter, ſofter, and more delicate. When there is too much of it, it renders the bread bitter. See the articles BAKING and BREAD.

The faculty of medicine of Paris, by a decree of March 24, 1688, ſolemnly maintained it noxious to the health of the people: yet could not that prevent its progreſs.

YEW, *taxus*, in botany. See TAXUS.

YEW, is alſo a term uſed by the ſalt-workers of Limington, and ſome other parts of England, to expreſs the firſt riſing of a ſcum upon the brine in boiling.

In the places where they uſe this term, they add no clarifying mixtures to the brine, for it ferments in the ciſterns, and all its foulneſs ſinks to the bottom, in form of a thin mud; they admit only the clear liquor into the pan, and boil this briſkly till it yews, that is, till a thin ſkin of ſalt appears upon its ſurface; they then damp the fire, and carefully ſkim off this film, and clear only the ſcratch, or calcareous earth, which ſeparates to the bottom.

They do not collect this into ſcratch-pans, as at many of the other works, but they rake it up to one ſide of the pan, and take it out; they then add a piece of butter, and continue the fire moderately ſtrong till the ſalt is granulated. They keep a briſker fire on this occaſion at Limington than in moſt of the other works, ſo that they will work three pans in twenty-four hours. See the article SALT.

YIELD, or SLACK *the hand*, in the manege, is to ſlack the bridle, and give the horſe head. See the article SLACK.

YLA, one of the weſtern iſlands of Scotland ſituated in the Iriſh-ſea, weſt of Cantire.

YNCA, or INCA, an appellation antiently given to the kings of Peru, and the princes of their blood; the word literally ſignifying lord, king, emperor, and royal blood.

YOAK, or YOKE, in agriculture, a frame of wood, fitted over the necks of oxen, whereby they are coupled together, and harneſſed to the plough. See PLOUGH.

It conſiſts of ſeveral parts, as the yoke, properly ſo called, which is a thick piece of wood, lying over the neck; the bow, which compaſſes the neck about; the ſtitchings and wreathings, which hold the bow faſt in the yoke; and the yokering and ox-chain.

The Romans made the enemies they ſubdued, paſs under the yoke, which they called *ſub jugum mittere*, that is, they made them paſs under a ſort of *furcæ patibulares*, or gallows, conſiſting of a pike, or other weapon, laid acroſs two others, planted upright, in the ground. See the article FURCA.

YOAK *of Land*, *jugata terræ*, in our antient cuſtoms, was the ſpace which a yoke of oxen, that is, two oxen, may plow in one day. See HYDE and YARD-LAND

*Sea*-YOAK. When the ſea is ſo rough, the the helm cannot be governed by the hands the ſeamen make a yoak to ſteer by, that is, they fix two blocks to the end of the helm

helm, and reeving two ſmall ropes thro' them, which they call falls, by having ſome men at each tackle, they govern the helm by direction. They have another way of making a ſea-yoak, by taking a double turn about the end of the helm with a ſingle rope, the ends being laid to the ſhip's ſides, by means whereof they guide the helm. See the article HELM.

YOANGFU, a city of China, in the province of Huguam, ſituated on the river Kiam, eaſt long. 114°, north lat. 30°40'.

YOLK, or YELK, *vitellus*, the yellow part in the middle of an egg. See EGG.

YONNE, a river in France, which riſing in Burgundy, and running north through Nivernois and Champain, falls into the Seyne at Monterau ſur Yonne.

YORK, the capital city of Yorkſhire, ſituated on the river Ouſe, 180 miles north of London: weſt long. 50', north lat. 54°. It is a large city, and has ſome good buildings in it, particularly the cathedral, which is a gothic pile, equal to any thing of the kind in England. It is the ſee of an archbiſhop, and ſends two members to parliament.

*New*-YORK, one of the britiſh colonies in North America, which comprehending the Jerſeys, that frequently have the ſame governor, is ſituated between 72° and 74° of weſt long. and between 41° and 44° of north lat. bounded by Canada on the north; New-England on the eaſt; the american Sea on the ſouth; and Penſilvania, and the country of the Iroquois on the weſt.

*New*-YORK, the capital city of this province, is ſituated on an iſland in the mouth of Hudſon's river, in weſt long. 72° 30', north lat. 41°.

YOUTH. See the article ADOLESCENCE. The renovation of youth has been much ſought after by chemical adepts; and many of them pretended to various ſecrets, for this purpoſe: but unluckily, the death of the pretenders proved a ſufficient refutation of their doctrine. Paracelſus talks of the mighty things he could do with his *ens primum*; and even Mr. Boyle tells us ſome ſtrange things about the *ens primum* of balm. See the article ENS.

YOUTH, *juventus*, in the Pagan theology, a goddeſs worſhipped among the Romans, who, together with the gods Mars and Terminus, kept her place in the capitol along with Jupiter, when the other deities were turned out. Whence the Romans drew a lucky omen for the durableneſs of their empire.

YPRES, a ſtrong city of the Auſtrian Netherlands, ſituated eaſt long. 2° 46', north lat. 50° 54'.

YPSILOIDES, in anatomy, the third genuine future of the cranium, thus called from its reſembling a greek υ or ypſilon. See SUTURE and SKULL.

YUCCA, the *Indian bread-plant*, in botany, a genus of the hexandria-monogynia claſs of plants, the corolla whereof is of a campanulated ſhape, and formed of ſix large oval petals, cohering at the baſe; or of a ſingle petal, divided almoſt to the baſe into ſo many ſegments; the fruit is an oblong, obtuſely triangular capſule, with three furrows, formed of three valves, and containing three cells; the ſeeds are numerous, and incumbent in a double order. The yucca approaches very near to the aloe, but is a diſtinct genus. A kind of bread is made from the dried root of this plant by the Indians, which much reſembles that made from the root of the caſſida or ſcutellaria of Linnæus. See the article SCUTELLARIA.

YVICA, a ſpaniſh iſland, ſituated in the Mediterranean Sea, between the province of Valencia, in Spain, and the iſland of Majorca: in 1° eaſt long. north lat. 39°, being about thirty miles long, and twenty-four broad.

# Z.

Z, or z, the twenty-fourth and laſt letter, and the nineteenth conſonant of our alphabet; the ſound of which is formed by a motion of the tongue from the palate downwards and upwards to it again, with a ſhutting and opening of the teeth at the ſame time. This letter has been reputed a double conſonant, having the ſound *ds*; but ſome think with very little reaſon; and,

and, as if we thought otherwise, we often double it, as in *puzzle*, *muzzle*, &c. Among the antients, Z was a numeral letter, signifying two thousand, and with a dash added a-top, Z̄ signified two thousand times two thousand, or four millions.

In abbreviations this letter formerly stood as a mark for several sorts of weights; sometimes it signified an ounce and a half, and very frequently it stood for half an ounce; sometimes for the eighth part of an ounce, or a dram troy weight; and it has in earlier times been used to express the third part of one ounce, or eight scruples. ZZ were used by some of the antient physicians to express myrrh, and at present they are often used to signify zinziber or ginger.

ZAARA, or SARRA, one of the divisions of Africa, situated under the tropic of cancer, is bounded by Bildulgerid, on the north; by the unknown parts of Africa on the east; by Nigritia, or Negroland, on the south; and by the Atlantic ocean, on the west. This is a barren desart, and so destitute of water, that the camels which pass over it from Morocco to traffic with Negroland, are half loaded with water and provisions.

ZABAC SEA, or PALUS MEOTIS. See the article MEOTIS.

ZACINTHA, STELLATED HAWK-WEED, in botany, the lapsona of Linnæus, a plant of the syngenesia-polygamia æqualis class, the compound flower of which is imbricated with about sixteen equal and uniform hermaphrodite corollulæ; the partial corolla is monopetalous, ligulated, truncated, and quinquedentated; there is no pericarpium; the seed is single, oblong, and cylindrically trigonal; the receptacle is naked and plain. This genus comprehends the lampsana, hedypnois, zacintha, and rhagadiolus, or rhagadioloides of authors. In the lampsana the seeds are all naked, not surrounded by the squamæ of the cup. In the rhagadiolus, every squama of the cup incloses a single seed. In the zacintha, the marginal seeds are each surrounded by a squama of the cup, and the central ones are coronated with a short simple down. In the hedypnois the marginal seeds are each surrounded in a squama of the cup, and the central ones are coronated with a cup divided into five denticles.

ZAFFER, or ZAFFRE, in chemistry, the name of a blue substance, of the hardness and form of a stone; and generally supposed to be a native fossil.

It is in reality, however, a preparation of cobalt; the calx of that mineral being mixed with powdered flints and wetted with water to bring it into this form. See the article COBALT.

To prepare this for use in the glass-trade, put it in gross pieces into earthen pans, and let it stand half a day in the furnace; then put it into an iron-ladle to be heated red hot in the furnace; take it out while thus hot, and sprinkle it with strong vinegar; and when cold, grind it on a porphyry to an impalpable powder; then throw this into water in glazed earthen pans; and when it has been well stirred about, let it settle, and pour off the water: repeat this washing often, and the foulness of the zaffre will be thus wholly separated: dry the powder, and keep it for use.

ZAIM, a portion of land allotted for the subsistance of a horseman in the turkish militia, called also timar. See the article TIMAR.

ZAIRAGIA, a kind of divination in use among the Arabs, performed by means of divers wheels or circles placed concentric to one another, and noted with several letters which are brought to answer to each other by moving the circles according to certain rules. See the article DIVINATION.

ZAMORA, a city of Spain, in the province of Leon, situated on the river Douro, thirty-two miles north of Salamanca: west long. 6°, north lat. 41° 30′.

ZAMOSKI, a town of Poland, in the province of Red Russia, and palatinate of Beltz, situated an hundred and ten miles north-east of Cracow.

ZANGUEBAR, a country on the east coast of Africa, situated in southern latitude between the equator and the tropic of capricorn, being bounded by the country of Anian, on the north; by the Indian ocean, on the east; by Caffraria, on the south, and by the unknown parts of Africa, on the west.

ZANNICHELLIA, in botany, a genus of the monoecia-monandria class of plants, the male-flower of which consists only of a single stamen; it has neither calyx nor corolla. In the female-flower the calyx is composed of a single leaf; there is no corolla; the germina are about four; the seeds, which are oblong and acuminated on both sides, are as many.

ZANONIA, in botany, a genus of the dioecia-

dioecia-pentandria claſs of plants; the calyx of the male-flower is formed of three leaves; the corolla is formed of a ſingle petal, divided into five parts. The calyx of the female-flower is alſo compoſed of three leaves, and the corolla formed of a ſingle petal, divided into five ſegments; the fruit is a long, very large, truncated berry, attenuated at the baſe; it contains three cells, placed under the receptacle: there are two plane-oblongo-roundiſh ſeeds in each cell.

ZANONIA, in botany, is alſo Plumier's name for the commelina of Linnæus. See the article COMMELINA.

ZANTE, an iſland in the Mediterranean-ſea, ſituated eaſt long. 21°. 30′, north lat. 37° 50′, being about twenty-four miles long, and twelve broad. The chief town is Zant, and is ſituated on the eaſt ſide of the iſland, being well fortified and defended by a caſtle.

ZAPATA, or SAPATA, a kind of feaſt or ceremony held in Italy, in the courts of certain princes, on St. Nicholas's day; wherein people hide preſents in the ſhoes or ſlippers of thoſe they would do honour to, in ſuch a manner as may ſurprize them on the morrow, when they come to dreſs; being done in imitation of the practice of St. Nicholas, who uſed, in the night-time, to throw purſes of money in at the windows, to marry poor maids withal.

ZARA, a city of Dalmatia, ſituated on the gulph of Venice: eaſt longitude 17°, north latitude 44°.

ZARNICH, in natural hiſtory, the name of a genus of foſſils; the characters of which are theſe: they are inflammable ſubſtances, not compoſed of plates or flakes, but of a plain, ſimple, and uniform ſtructure, not flexile nor elaſtic, ſoluble in ore, and burning with a whitiſh flame, and noxious ſmell like garlic. Of this genus there are four known ſpecies: 1. A red one, which is the true ſandarach. See the article SANDARACH. 2. A yellow one found in great abundance in the mines of Germany, and frequently brought over to us among, and under the name of, orpiment. 3. A greeniſh one, very common in the mines of Germany, and ſold in our colour-ſhops under the name of a coarſe orpiment. This is alſo found in our own country among the tin mines of Cornwall. And, 4. A whitiſh one, a very remarkable ſubſtance, which has the property of turning black ink into a fine florid red. This is common in the mines of Germany, but is of little value. See ORPIMENT.

ZARNAW, a city of Poland, in the province of little Poland and palatinate of Sandomir, ſituated eaſt long. 20°, north lat. 51° 30′.

ZATMAR, a town of Hungary, ſituated forty-five miles eaſt of Tockay.

ZATOR, a town of Poland, ſituated on the river Viſtula, fourteen miles weſt of Cracow.

ZEA, INDIAN CORN, in botany, a genus of the monoecia triandria claſs of plants. In the male flower the calyx is a biflorous glume, and has no ariſtæ, or awns; the corolla is alſo a glume without awns. In the female flower the calyx is a glume formed of two valves; the corolla is alſo a glume formed of two valves; the ſtyle is ſimple, filiform, and pendulous; the ſeeds are ſingle, and are immerſed in a long receptacle.

ZEAL, ζῆλος, the exerciſe of a warm animated affection, or paſſion, for any thing. See the article PASSION.

The greek philoſophers make three ſpecies of zeal. The firſt of envy, the ſecond of emulation or imitation, the third of piety or devotion, which laſt makes what the divines call a religious zeal. See ENVY and EMULATION.

ZEALAND, the chief of the daniſh iſlands, is ſituated at the entrance of the Baltic-ſea, bounded by the Schaggerrac-ſea, on the north; by the Sound, which ſeparates it from Schonen, on the eaſt; by the Baltic-ſea, on the ſouth; and by the ſtrait called the Great Belt, which ſeparates it from the iſland of Funen, on the weſt; being of a round figure, near two hundred miles in circumference: the chief town is Copenhagen.

ZEALAND, is alſo a province of the United Netherlands, conſiſting of eight iſlands, which lie in the mouth of the river Scheld, bounded by the province of Holland, from which they are ſeparated by a narrow channel, on the north; by Brabant, on the eaſt; by Flanders, from which they are ſeparated by one of the branches of the Scheld, on the ſouth; and by the German-ocean, on the weſt.

ZEALOTS, an antient ſect of the Jews, ſo called from their pretended zeal for God's laws, and the honour of religion. The zealots were a moſt outrageous and ungovernable people; and on pretence of aſſerting God's laws, and the ſtrictneſs and purity of religion, aſſumed a liberty of queſtioning notorious offenders

without

without ftaying for the ordinary formalities of law. Nay, when they thought fit, they executed capital punifhments upon them with their own hands. They looked upon themfelves as the true fucceffors of Phineas, who out of a great zeal for the honour of God, did immediate execution upon Zimri and Cozbi; which action was fo pleafing to God, that he made with him and his feed after him the covenant of an everlafting priefthood.

ZEBLICIUM *marmor*, in natural hiftory, a name given by feveral authors to a foft green marble variegated with black and white; and though the authors who have defcribed it have not obferved it, yet it no way differs from the white ophites of the antients. See the articles MARBLE and OPHITES.

ZEBRA, the WILD ASS, in zoology, a fpecies of equus, tranfverfely ftriated. See the articles HORSE and ASS.

This is an extremely beautiful animal, and though in colouring fo much different from all other kinds and varieties of equus, agrees with it in all other refpects: it is about equal to the common afs in fize, but of a much more elegant figure; the head is fmall and fhort, the ears are long, the eyes are large and bright, and the mouth confiderably large; the neck is long and flender, but elegantly turned; the body is rounded, and fmall in comparifon of that of the common afs; the legs are long and flender, the tail long and beautiful, but hairy only at the end. See plate CCCII. fig. 1.

The whole animal is party-coloured, or beautifully ftriped in a tranfverfe direction, with long and broad ftreaks, alternately of a deep, gloffy, and fhining brownifh and whitifh, with fome abfolutely black. It is a native of many parts of the Eaft.

ZECHARIAH, a canonical book of the Old Teftament, containing the predictions of Zechariah, the fon of Barachia, and grandfon of Iddo. He is the eleventh of the twelve leffer prophets. Zechariah entered upon the prophetic office at the fame time with Haggai, and was fent to the Jews upon the fame meffage, to reprove them for their backwardnefs in erecting the temple, and reftoring divine worfhip; but efpecially for the diforder of their lives and manners, which could not but derive a curfe upon them. By feveral notable vifions and types, he endeavours to confirm their faith, and eftablifh their affurance concerning God's providence with them, and care over them; and as a proof and demonftration of this, he interfperfes the moft comfortable promifes of the coming of the kingdom, the temple, the priefthood, the victory, the glory of Chrift the branch. Nor does he forget to affure them of the ruin of Babylon, their moft implacable enemy. This prophet is the longeft and moft obfcure of all the leffer prophets, his ftyle being interrupted and without connection.

ZEDOARY, in the materia medica, a root, the feveral pieces of which differ fo much from one another in fhape, that they have been divided into two kinds, as if two different things, under the names of the long and round zedoary, being only the feveral parts of the fame root.

The long pieces of zedoary are of a very fingular figure; they are not of the nature of the common long roots of plants, but are, themfelves, properly tubera or glandules, as well as the round ones, differing from them in nothing but their oblong figure: they are two, three, or four inches in length, and of the thicknefs of a man's finger; not large at one end and tapering away to the other, but thickeft in the middle, and growing gradually fmaller to each end, where they terminate in an obtufe point each way: they are of a tolerable fmooth furface, except that they have fome little protuberances in feveral parts from which fibres have originally grown: they are of a very clofe and compact texture, confiderably heavy, and very hard; they will not cut eafily with a knife; when cut, they fhew a fine, fmooth, and gloffy furface; they are of a pale greyifh colour on the outfide, with a faint mixture of brown in it, and are of dead whitifh hue within: they are not eafily powdered in the mortar; their fmell, while bruifing, is very remarkable, and is highly aromatic, and of a bitterifh tafte. The round zedoary has all the fame characters with this, and differs only in figure, being fhort and roundifh, of the fize of a fmall walnut, fmooth on the furface, except where the bundles of fibres have adhered, and generally running into a fharp point at the end.

Zedoary is to be chofen frefh, found, and hard, in large pieces; it matters not as to fhape, whether long or round; of a fmooth furface, and of a fort of fatty appearance within, too hard to be bitten by

by the teeth, and of the brifkeft fmell that may be; fuch as is friable, dufty, and worm-eaten, is to be rejected.

The antient Greeks were wholly unacquainted with zedoary; there is no mention of any fuch drug in the works of Diofcorides or Galen. The Arabians, however, were well acquainted with it; they mention it fometimes under the name of zedoary, and fometimes under that of zerumbeth, but are fo fhort in their defcriptions, and fo at variance among one another, that it is not eafy to afcertain their meaning, as to the diftinction, if they originally meant any, between the fubftances expreffed by thefe two names.

Serapio and Rhazes ufe the words zedoaria and zerumbeth as fynonymous, and declare both to mean only the fame root. Avicenna, on the contrary, diftinguifhes the zedoary and zerumbeth, and even talks of two kinds of zedoary. Others of them make the zarnab they fpeak of different both from the zedoary and zerumbeth; but Serapio, an author as much to be depended upon for his accuracy as any of them, declares zedoary, zerumbeth, and zarnab, all to be the fame thing.

Zedoary, both of the long and round kind, is brought us from China; and we find by the Arabians, that they alfo had it from the fame place. The round tubera are lefs frequent than the long, and fome of them have, therefore, fuppofed them the produce of a different and more rare plant; but this is not fo probable as that the general form of the root is long, and the round tubera are only lufus naturæ, and lefs frequent in it.

The plant which produces it, is one of the clafs of the herbæ bulbofis affines of Mr. Ray. It is defcribed, in the Hortus Malabaricus, under the name of the malan kua. Zedoary, diftilled with common water, affords a thick and denfe effential oil, which foon concretes of itfelf into a kind of camphor, and on this oil its virtues principally depend. It is a fudorific, and is much recommended by fome in fevers, efpecially of the malignant kinds. It is alfo given with fuccefs as an expectorant in all diforders of the breaft, arifing from a tough phlegm, which it powerfully incides and attenuates; it is alfo good againft flatulences, and in the cholic; it ftrengthens the ftomach, and affifts digeftion; and, finally, is given with fuccefs in nervous cafes of all kinds. It is not an ingredient in any of our fhop-compofitions. It was in the Philonium Romanum of the late London Difpenfatory, but it is now omitted in the Philonium Londinenfe of this: in extemporaneous prefcriptions it is feldom given fingly, but is a common ingredient in reftorative powders and infufions. Its dofe is from five to ten grains in powder, and from a drachm to two drachms to the point in infufion.

ZEIGINHEIM, a town of Germany, in the landgraviate of Heffe-Caffel, fituated thirty miles fouth of Heffe-Caffel city.

ZEITS, a town of Germany, in the circle of Upper Saxony, fituated twenty-four miles fouth-weft of Leipfic.

ZELL, a city of Germany, in the circle of Lower Saxony, capital of the dutchies of Zell and Lunenburg, fituated at the confluence of the rivers Aller and Fuhfe, thirty miles north of Hanover, and forty fouth of Lunenburg: eaft longitude 10°, north latitude 52° 52'.

ZEMBLA NOVA. See NOVA-ZEMBLA.

ZEND, or ZENDAVESTA, a book containing the religion of the magians, or worfhippers of fire, who were difciples of the famous Zoroafter. See MAGI.

This book was compofed by Zoroafter during his retirement in a cave, and contained all the pretended revelations of that impoftor. The firft part contains the liturgy of the magi, which is ufed among them in all their oratories and fire-temples to this day; they reverence it as the chriftians do the Bible, and the mahometans the Koran. There are found many things in the zend taken out of the fcriptures of the Old Teftament, which Dr. Prideaux thinks is an argument that Zoroafter was originally a Jew. Great part of the Pfalms of David are inferted: he makes Adam and Eve to have been the firft parents of mankind, and gives the fame hiftory of the creation and deluge as Mofes does, and commands the fame obfervances about clean and unclean beafts, the fame law of paying tythes to the facerdotal order, with many other inftitutions of jewifh extraction. The reft of its contents are an hiftorical account of the life, actions, and prophecies of its author, with rules and exhortations to moral living. The mahometans have a fect which they call zendikites, who are faid to be the fadducees of mahometanifm, denying providence

dence and the refurrection, believing the tranfmigration of fouls, and following the zend of the magi.

ZENITH, in aftronomy, the vertical point; or a point in the heavens directly over our heads. See the articles NADIR, VERTEX, and VERTICAL.

The zenith is called the pole of the horizon, becaufe it is ninety degrees diftant from every point of that circle. See the articles POLE and HORIZON.

ZENITH-DISTANCE, is the complement of the meridian altitude of any heavenly object; or it is the remainder, when the meridian altitude is fubtracted from ninety degrees. See the articles COMPLEMENT and ALTITUDE.

ZENSUS, in arithmetic, a name given to a fquare number, or the fecond power, by fome authors. See SQUARE and POWER.

ZEPHANIAH, a canonical book of the Old Teftament, containing the predictions of Zephaniah the fon of Cufhi, and grandfon of Gedaliah; being the ninth of the twelve leffer prophets. He prophefied in the time of king Jofiah, a little after the captivity of the ten tribes, and before that of Judah; fo that he was contemporary with Jeremiah. He freely publifhes to the Jews, that what increafed the divine wrath againft them, was their contempt of God's fervice, their apoftacy, their treachery, their idolatry, their violence and rapine, and other enormities: fuch high provocations as thefe, rendered their deftruction terrible, univerfal, and unavoidable: and then, as moft of the prophets do, he mingles exhortations with repentance, as the only expedient in thefe circumftances.

ZEPHYR, *zephyrus*, the weft wind; or that which blows from the cardinal point of the horizon oppofite to the eaft. See WIND, WEST, and COMPASS.

ZEST, the woody thick fkin, quartering the kernel of a walnut; prefcribed by fome phyficians, when dried and taken with white-wine, as a remedy againft the gravel.

Zeft is alfo ufed for a chip of orange or lemon-peel; fuch as is ufually fqueezed into ale, wine, &c. to give it a flavour; or the fine ethereal oil which fpurts out of that peel on fqueezing it.

ZETETIC METHOD, in mathematics, the method made ufe of to inveftigate or folve a problem.

ZEUGMA, a figure in grammar, whereby an adjective or verb which agrees with a nearer word, is alfo, by way of fupplement, referred to another more remote.

ZEUS, in ichthyology, a genus of the acanthopterygious order of fifhes, the characters of which are as follow: the body is is very broad, thin, and compreffed; the fcales are rough; there is only one fin on the back, but it is very long, and cut in fo deeply near the anterior part, that it appears to be two fins; the branchioftege membranes do not confift of parallel bones, as in other fifh, but have a number of officles of various figures, fome of them placed longitudinally, fome tranfverfely, and fome obliquely.

To this genus belong the doree, the indian doree, and the aper or riondo. See the articles DOREE and RIONDO.

ZIBETHICUS, ZIBETHICUM ANIMAL, the CIVET CAT, in zoology, the grey meles, with uniform claws. See the article MELES.

It was long before the form of this creature, to whom we owe the civet, was known, and long after this before it could be determined to what genus of quadrupeds it belonged: it was firft fuppofed of the cat, and afterwards of the dog-kind; but it is truly one of the badger fpecies. It is a large and fierce animal; (See plate CCCII. fig. 2.) its fize is that of the common badger, but its body is not fo bulky; the head is large, oblong, and confiderably thick; the fore-head is depreffed; the fnout is rounded and thick; the nofe turns up a little; the mouth is wide, and is furnifhed in a very formidable manner, with teeth; and there are a few rigid but very long whifkers placed about it; the eyes are fmall, the ears large, obtufe, and patulous; the neck is long, rigid, and thick; the tail long, and refembling that of the common cat; it is covered with hair, and there runs a ridge of the fame hair all along the top of the back. The whole animal is of a light filvery colour, variegated in a beautiful manner, with large fpots of black; the legs are very robuft, almoft intirely black, the feet are armed with very long and fharp claws; under the tail is fituated the bag, in which is contained the perfume we call civet; and its fituation is the fame with that which contains the white febaceous matter in the badger. See BADGER and CIVET.

ZIBETHUM, *civet*. See CIVET.

ZIMENT-WATER, or COPPER-WATER, in natural hiftory, the name by which fome have called water found in places where

where there are copper-mines, and lightly impregnated with particles of that metal. See COPPER and VITRIOL.

The moft famous fpring of this kind is about a mile diftant from Newfol, in Hungary, in a great copper-mine, where the water is found at different depths, and is received into different bafons, for the purpofe of feparating the copper from it. In fome of thefe it is much more highly fated with this metal than in others, and will make the fuppofed change of iron into that metal much fooner. The moft common pieces of iron ufed in the experiments, are horfefhoes, nails, and the like; they are found very little altered in fhape after the operation, except that their furfaces are more raifed. The water which performs this wonderful operation appears greenifh in the bafons where it ftands; but if a glafs of it be taken up, it looks clear as cryftal; it has no fmell, but has a very ftrong vitriolic and aftringent tafte, infomuch, that the lips and tongue are bliftered and fcorched on tafting it. The miners ufe this water as a medicine; and whatever ficknefs they are feized with, they firft attempt its cure by large dofes of the water, which ufually both vomits and purges them brifkly; they alfo ufe it in diforders of the eyes. The copper produced from thefe waters is valued by the people much beyond any other copper, as being more ductile, and running eafier in the fire. And from the feveral experiments made upon the water, the true nature of it may be eafily underftood. It contains a large quantity of the vitriol of copper, which it probably owes to a folution of that metal, by means of the acid of the common pyrites and water. When this is known the effects are not difficult to be accounted for; there being no real change of one metal into another, but the true ftate of the cafe being that the particles of one metal are diffolved and carried away, and thofe of another metal depofited in their place; a water thus impregnated is a menftruum capable of diffolving iron, and in the folution of that metal becomes fo weakened as to let go the copper it before contained in fmall parcels.

ZINC, or ZINK. See the article ZINK.

ZINGIBER, or ZINZIBER, *ginger*, in botany and pharmacy, *&c.* See the article ZINZIBER and GINGER.

ZINK, or ZINC, or ZINCK, in natural hiftory, the name of a very remarkable foffil fubftance, refembling bifmuth in appearance, but of a bluer colour. See the article BISMUTH.

It is a very remarkable mineral, and one that has never been well underftood as to its origin, till of late; for though the world well knew of a long time both zink and lapis calaminaris, and knew that both of them had the remarkable property of turning copper into brafs, which one would think might have given a hint to the difcovery of a natural alliance between them; yet have they been ever treated of as two different fubftances, by the writers on thefe fubjects; and Dr. Lawfon was the firft who ever publicly declared, and proved, lapis calaminaris to be the ore of zink. See the article CALAMINARIS *Lapis*.

Zink is generally confounded with bifmuth, though in reality a very different body; but the regulus of thefe two minerals having a very great external refemblance, the vulgar have not diftinguifhed them; and hence we hear of many ores of zink in the lefs accurate writers, all which are truly the ores of bifmuth.

The lapis calaminaris is the true and general ore of zink, yet that mineral is not confined to this ore alone, but is mixed in great abundance in its diffeminated particles among the matter of the ores of other metals, particularly of lead.

Our artificers have long been acquainted with zink, under the name of fpelter; but none of them till of late have ever been able to make any guefs as to its origin. We have much zink brought to us from the Eaft-Indies, under the name of tutenag; yet no body ever knew from what, or how it was produced there; and all that was heretofore known of it was, that among that ftrange mixture of ores which the great mines yields at Goffelaer in Saxony, when they were fufed for other metals, a large quantity of zink was produced; but Dr. Lawfon obferving, that the flowers of zink and of lapis calaminaris were the fame, and that their effects on copper were the fame, never ceafed his inquiries till he found the method of feparating zink from it.

The pure zink is a folid metal-like body, of a bluifh white, and fomewhat lefs brittle than bifmuth, efpecially when gently

gently heated, and moft, of all the metallic minerals, approaches to malleability: it melts in a very fmall fire, and in a ftrong one takes fire, burning with a bluifh-green flame, and fubliming into white flowers, which are with difficulty reducible again into the form of zink: in an open fierce fire, it wholly flies off in vapour.

There is great reafon to believe, that all the zink or tutenag brought from the Eaft-Indies, is procured from calamine; and we have now on foot at home, a work eftablifhed by the difcoverer of this ore, which will probably make it very foon unneceffary to bring any zink into England, as we have great plenty of the calamine.

The manner of extracting zink from the lapis calaminaris, is this: the lapis calaminaris muft be finely pulverized, and well mixed with an eighth part of charcoal-duft, and put into a clofe retort to prevent the accefs of the air, which would inflame the zink as it rifes. The retort is to be placed on a violent fire, fufficient to melt copper. After fome time the zink rifes, and appears in the form of metallic drops within the neck of the retort. When the veffel is cool, it muft be taken out, by breaking off the neck of the retort.

*Flowers of* ZINK. The flowers of zink are a fubftance famous in the writings of the chemifts, who have led their followers into a thoufand errors by the names by which they have called them.

Some have called them talc, and a folution of them in vinegar, oil of talc; to which they have attributed very extraordinary qualities. Some have fet the ignorant upon a fruitlefs attempt of extracting an oil from venetian talc, to do all the things they have commemorated of this oil. Others have called thefe flowers the fericum: others the aqua ficca philofophorum; and others the philofophic cotton.

The moft fimple and eafy way of obtaining the flowers of zink pure and white, is this: melt the zink in a tall crucible inclined in the furnace in an angle of 45 degrees, or thereabouts; let the fire be moderate, little ftronger than would be neceffary for the melting of lead. If the zink is left in this ftate without being ftirred, it forms a grey cruft upon its furface, and becomes calcined by degrees under it into a granulofe white fubftance; but to have the flowers, the matter muft be ftirred from time to time with an iron rod, and this cruft broken as often as it arifes; there will then, after fome time, appear a bright white flame, and about two inches above it there will be found a very thick fmoak, and with this there will arife a quantity of very white flowers, which will fix themfelves to the fides of the crucible in the form of fine cotton.

Thefe flowers are to be feparated at times, and by careful management there may be collected from the zink a greater weight of flowers than its own weight, when put into the fire. In working four pounds of zink in this manner, there will be only about an ounce of a calcined earthy matter left at the bottom of the crucible, and the quantity of flowers will be about two drams and a half in each pound, more than the quantity of zink; befide that, it is eafy to conceive from the manner of making them, that a great quantity muft have been carried away with the fmoak. And this is not to be prevented, fince, if the veffel be clofed to keep in the fumes, the external air being denied free accefs, the fublimation immediately ceafes, and no more flowers can be obtained, till the veffel is again opened, and the air admitted.

The fumes of zink have a ftrong fmell of garlic, and are very noxious to the lungs. The reducing zink into thefe flowers, is the deftroying it abfolutely as to its metallic form; for none of the methods ufed by chemifts to bring back metals to their original ftate, are able to bring thefe flowers to zink again.

ZINZIBER, or ZINGIBER, GINGER, in botany, the naked ftalked oval fpiked amomum. See the articles AMOMUM and GINGER.

ZIRICKSEE, a port-town of the United Netherlands, in the province of Zealand, fituated on the fouth fide of the ifland of Schowen, fifteen miles north-eaft of Middleburg.

ZITTAU, a town of Germany, in the circle of Upper Saxony, and marquifate of Lufatia, fituated on the river Niefs, fifty-five miles eaft of Drefden.

ZIZANIA, in botany, a genus of the monoecia-hexandria clafs of plants; the male corolla whereof is a glume formed of two valves; the female corolla is a glume formed of a fingle valve, of a cuculated form, and terminated by an arifta or awn; there is no calyx in either

the male or female flowers; the feed is fingle, and placed in the bottom of the corolla, which opens horizontally to let it out.

ZIZIPHORA, the AMETHYSTEA, in botany, a genus of the diandria-monogynia clafs of plants, the corolla whereof is formed of a fingle ringent petal; the tube is cylindric, and of the length of the cup; the limb is very fmooth, the upper lip is ovated, erect, emarginated, and obtufe, the lower lip is broad and patent, and is divided into three equal rounded fegments; there is no pericarpium, but the cup contains four feeds which are oblong and obtufe, gibbous on one fide, and angular on the other.

ZIZIPHUS, in botany, a name whereby fome authors call the rhamnus. See the article RHAMNUS.

ZOCCO, ZOCCOLO, ZOCLE, or SOCLE, in architecture, a kind of ftand or pedeftal, being a low fquare piece, or member, ferving to fupport a bufto, ftatue, pedeftal, or the like thing that needs to be raifed. See the article SOCLE.

ZODIAC, *zodiacus*, in aftronomy, a fafcia or broad circle, whofe middle is the ecliptic, and its extremes two circles, parallel thereto, at fuch a diftance from it, as to bound or comprehend the excurfions of the fun and planets. See the articles ECLIPTIC, EARTH, PLANET and SUN.

The fun never deviates from the middle of the zodiac, *i. e.* from the ecliptic, but the planets all do more or lefs. Their greateft deviations, called latitudes, are the meafure of the breadth of the zodiac, which is broader or narrower, as the greateft latitude of the planets is made more or lefs; accordingly fome make it fixteen, fome eighteen, and fome twenty degrees broad. See LATITUDE.

The zodiac, cutting the equator obliquely, makes an angle therewith, of 23° and a half, or more precifely of 23° 29′, which is what we call the obliquity of the zodiac, and is the fun's greateft declination. See the articles OBLIQUITY and DECLINATION.

The zodiac is divided into twelve portions, called figns, and thofe divifions or figns are denominated from the conftellations which antiently poffeffed each part; but the zodiac being immoveable, and the ftars having a motion from weft to eaft, thofe conftellations no longer correfpond to their proper figns, whence arifes what we call the preceffion of the equinoxes. See the articles SIGN, CONSTELLATION, and PRECESSION.

When a ftar therefore is faid to be in fuch a fign of the zodiac, it is not to be underftood of that fign or conftellation of the firmament, but only of that twelfth part of the zodiac, or dodecatemory thereof. See the articles STAR and DODECATEMORY.

Caffini has alfo obferved a track in the heavens, within whofe bounds moft of the comets, though not all of them, are obferved to keep, which for this reafon he calls the zodiac of the comets. See the article COMET.

This he makes as broad as the other zodiac, and marks it with figns and conftellations like that, as Antinous, Pegafus, Andromeda, Taurus, Orion, the leffer Dog, Hydra, the Centaur, Scorpion, and Sagittary.

ZOLLERN, or HOENZOLLERN, a city of Germany, in the circle of Swabia, capital of the county of Zollern, and fubject to its count, fituated eaft long. 8° 55′, north lat. 48° 18′.

ZOLNOCK, a town of Upper Hungary, fituated on the river Teyeffe, fifty-five miles eaft of Buda.

ZONA, or ZONA IGNEA, the *fhingles*, in medicine, a fpecies of herpes. See the article HERPES.

ZONE, ζώνη, in geography and aftronomy, a divifion of the terraqueous globe, with refpect to the different degrees of heat found in the different parts thereof. See the articles EARTH and HEAT.

A zone is the fifth part of the furface of the earth, contained between two parallels. See the article PARALLEL.

The zones are denominated torrid, frigid and temperate.

The torrid zone is a fafcia, or band furrounding the terraqueous globe, and terminated by the two tropics. Its breadth is 46° 58′. The equator, running thro' the middle of it, divides it into two equal parts, each containing 23° 29′. The antients imagined the torrid zone uninhabitable. See TROPIC and TORRID.

The temperate zones are two fafciæ, or bands, environing the globe, and contained between the tropics and the polar circles, the breadth of each is 43° 2′. See the article TEMPERATE.

The frigid zones are fegments of the furface of the earth, terminated, one by the antarctic, and the other by the arctic circle. The breadth of each is 46° 58′. See ARCTIC and ANTARCTIC.

ZON-

ZONNAR, a kind of belt, or girdle of black leather, which the Christians and Jews of the Levant, particularly those in Asia, and the territories of the grand seignior, are obliged to wear to distinguish them from the mahometans.

ZOOLOGY, Ζωολογια, the science of animals. Artedi observes, that this makes one of the three kingdoms, as they are called, of natural history; the vegetable and the mineral being the two others: in these, however, there is this difference made by writers, that while vegetables and minerals are treated of together, as all of a piece in each, the subjects of zoology are divided; and it is made to compose, as it were, several kingdoms. Whoever is to write on plants and minerals, calls his work a treatise of botany, or mineralogy; and we have no words to express any subdivision of them into kingdoms: but, in zoology, we treat as different subjects, the different parts of it; and the history of birds is separated by some from the rest under the name of ornithology; that of quadrupeds under the name of tetrapodology; and we have for the rest, the words entomology, amphibiology, and the like, expressing these things which are properly but the parts of zoology, as so many distinct and separate studies. See the articles BOTANY and MINERALOGY.

The same author observes, that this may easily be amended, by our considering the animal world as we do the vegetable and mineral, and dividing it, as we do the others, into its proper families; it will then be found that these are no better distinctions than those of the families of these things, and that the authors may as well set up separate studies under the names of bulbology, umbelliferology, and the like, as those.

A natural division of the subjects of zoology, on this principle, will afford six several families of its subjects. 1. The hairy quadrupeds. 2. The birds. 3. The amphibious animals, such as serpents, lizards, frogs, and tortoises. 4. The fishes. 5. The insects. And sixthly, those lowest order of animated beings the zoophytes. See the articles QUADRUPED, BIRD, FISH, ORNITHOLOGY, ICHTHYOLOGY, *&c.*

ZOOPHORIC, or ZOOPHORIC COLUMN, is a statuary column, or a column that bears and supports the figure of an animal. See the article COLUMN.

ZOOPHORUS, or ZOPHORUS, in the antient architecture, the same thing with frieze in the modern. See FRIEZE.

ZOOPHYTON, or ZOOPHITE, in natural history, a kind of intermediate body, partaking both of the nature of a sensitive, and a vegetable. See the article SENSITIVE *Plant.*

ZOOTOMY, the art of dissecting animals, or living creatures, being the same with anatomy, or rather comparative anatomy. See the articles DISSECTION and ANATOMY.

ZOPISSA, *naval pitch*, a kind of mixture of pitch and tar, scraped off ships that have been a long time at sea.

This matter by being gradually penetrated by the salt of the sea, becomes partaker of its qualities, and being applied to the body externally, is found to be resolutive and deficcative.

ZUG, one of the cantons of Switzerland, is surrounded by the cantons of Lucern, Zurich and Switz, and is eighteen miles long, and seven broad.

ZUINGLIANS, a branch of the antient christian reformers, or protestants, so called, from their author Huldric Zuinglius, a divine of Switzerland, who soon after Luther had declared against the church of Rome; and being then minister of the church at Zurich, fell in with him, and preached openly against indulgences, the mass, the celibacy of the clergy, *&c.* What he differed from Luther in, concerned the eucharist: for interpreting *hoc est corpus meum*, by *hoc significat corpus meum*, he maintained, that the bread and wine were only significations of the body and blood of Jesus Christ; whereas Luther held a consubstantiation. As to the matter of grace, Zuinglius seemed inclined to Pelagianism, in which he differed from Calvin.

ZURICH, a canton of Switzerland, bounded by the canton of Schaffhausen, on the north; by the canton of Appenzel on the east; by Zug and Switz on the south; and by Bern and Lucern on the west, being fifty miles long, and forty broad.

Zurich is also the name of the capital city of this canton, situated east long. 8° 30′, and north lat. 47° 52′. It is likewise the name of a lake, twenty-four miles long, and three broad; at the south end of which the city of Zurich stands.

ZUTPHEN, a city of a county of the same name, in Gelderland, situated on the river Yssel, sixteen miles north-east of Arnheim: east long. 6°, north lat. 52° 15′.

ZUYDERSEE, a great bay of the German Ocean, which lies in the middle of the United Provinces, having the iflands of Texel, Flie, and Schelling, at the entrance of it, on the north; the provinces of Friefland, Overyffel and Gelderland on the eaft; Utrecht, and part of Holland on the fouth; and another part of Holland on the weft. The chief town is Amfterdam.

ZWEIBRUGGEN, a county of the palatinate of the Rhine, in Germany, fubject to the duke of Deuxponts.

ZWICKOW, a town of the circle of Upper Saxony, and territory of Voightland, fituated on the river Muldaw, forty-fix miles fouth-weft of Drefden.

ZWINGENBURG, or SWINGENBURG, a town of Germany, in the circle of the Upper Rhine, and land of Heffe Darmftat, twelve miles north-eaft of Worms.

ZYGÆNA, or BALLANCE-FISH, in ichthyology, a fpecies of fqualus, with a very broad tranfverfe hammer-like head. See the article SQUALUS.

This is one of the moft extraordinary fifh in the world; in its form the general fize is five or fix feet, but it grows to be much larger; the head is the moft extraordinary figure of that of any fifh. It is not oblong, and running in a line with that of the body, but is placed tranfverfely, and has the appearance of the head of a hammer faftened to its handle; the eyes are large, and placed at the two extremities; the mouth is tranfverfe cut on the lower part of the head, and furnifhed with three or four rows of fharp teeth; the noftrils are fmall and not very confpicuous, and the foramina at the eyes are oblong and large; the body is oblong and moderately thick; there are two back fins, and a pinna ani; the apertures of the gills are ten oblong flits, five on each fide, running from juft below the head towards the roots of the pectoral fins: the tail is divided into two parts, and the upper of thefe is much longer than the under. See plate CCCII. fig. 5.

ZYGOMA, in anatomy, a bone of the head, otherwife called os jugale, being no fingle bone, but an union or affemblage of two proceffes, or eminences of bones; the one from the os temporis, the other from the os malæ; thefe proceffes are hence termed the zygomatic proceffes, and the future that joins them together, is denominated the zygomatic future. See PETROSA and SUTURE.

ZYGOMATICUS, in anatomy, a mufcle of the head, arifing from the os zygoma, whence its name, and terminating at the angle of the lips. This mufcle, though ufually fingle, is fometimes double throughout; at other times it has a double head; fometimes its tail only is bifid, and it is varioufly interwoven with the adjoining ones. See the preceding article.

ZYGOPHYLLUM, *bean-capers*, in botany, a genus of the decandria-monogynia clafs of plants, the corolla whereof is compofed of five petals broadeft at the top; obtufe, emarginated and larger than the cup; the nectarium confifts of ten convergent leaves, and includes the germen; the fruit is an oval pentagonal capfule, formed of five valves, containing five cells, with fepta adhering to the valves; the feeds are numerous, roundifh, and compreffed; the figure of the fruit is fubject to variation, and there is a fpecies in which the parts of fructification are a fifth lefs. This genus comprehends the fabago of Tournefort.

ZYMOLOGY, in chemiftry, is a term ufed by fome writers, to exprefs a treatife on fermentation, or the doctrine of fermentation in general. And,

ZYMOSIMETER is an inftrument propofed by Swammerdam, wherewith to meafure the degree of fermentation occafioned by the mixture of different matters, and the degree of heat which thofe matters acquire in fermenting; as alfo the heat or temperament of the blood of animals. See the articles FERMENTATION, HEAT, &c.

ZYTHOGALA, *beer poffet*, a drink recommended by Sydenham, as good to be taken after a vomit, for allaying the acrimonious and difagreeable tafte the vomit has occafioned, as well as to prevent gripes.

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